

Northern California's Computer Magazine

June 28, 1993 • #110

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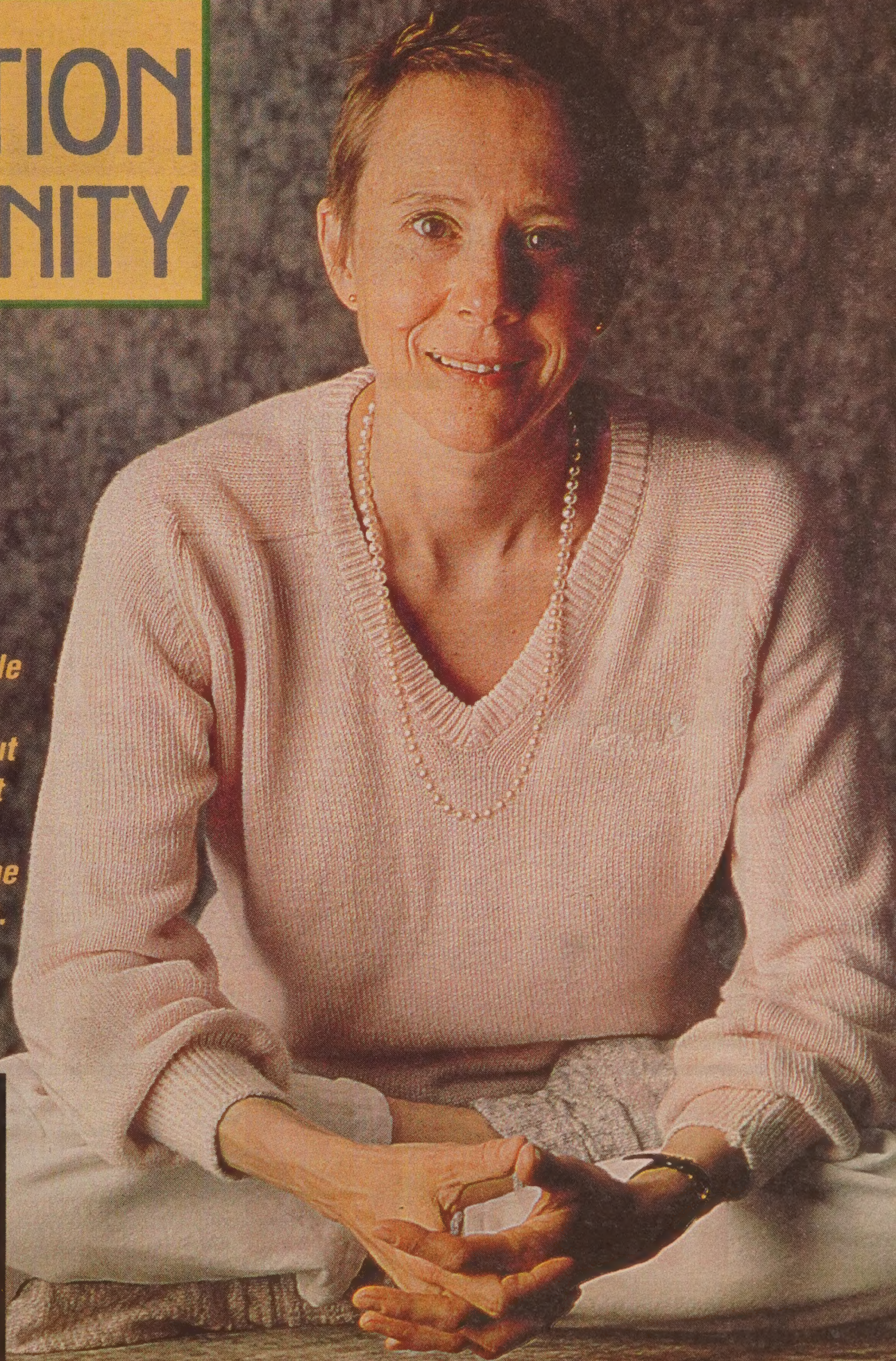
MICROTIMES

REVOLUTION & OPPORTUNITY

AN
INTERVIEW
WITH
INDUSTRY
ANALYST...

ESTHER DYSON

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Amiga Tools;
Rock & Roll;
3D Virtual Reality;
Windows MIDI

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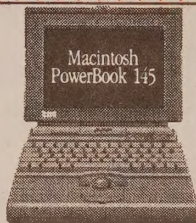
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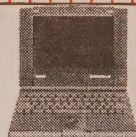
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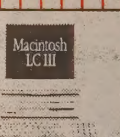
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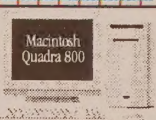
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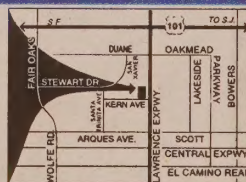
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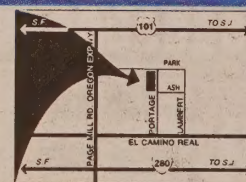
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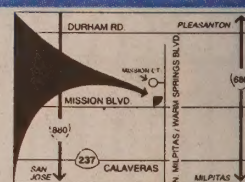
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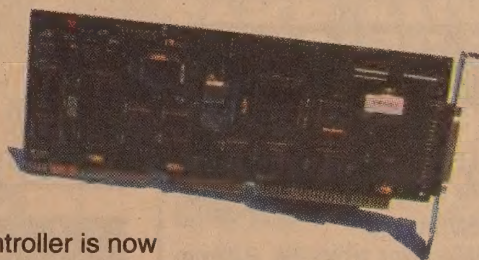
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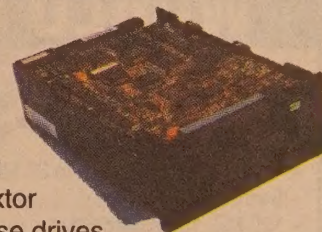
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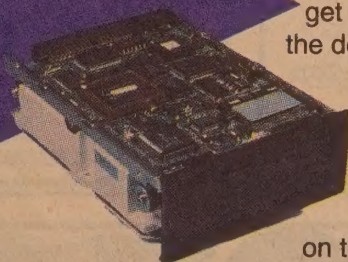
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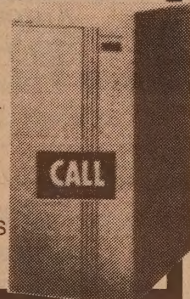
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A NOTE FROM THE EDITORS

We're very pleased to bring you this month's cover story, a long interview with industry analyst Esther Dyson, who specializes in the interesting and non-obvious.

—ME

COVER STORY

Revolution & Opportunity

An Interview With Esther Dyson

By Mary Eisenhart 46

Cover Photo: Chuck Gathard

From the PC revolution to the recent developments in Eastern Europe to such emerging technologies as wireless communications, groupware, and artificial life, Esther Dyson has been in the midst of it all, and often making it happen. Here's a look at things from her perspective these days.



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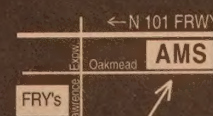
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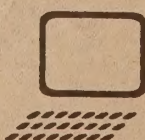
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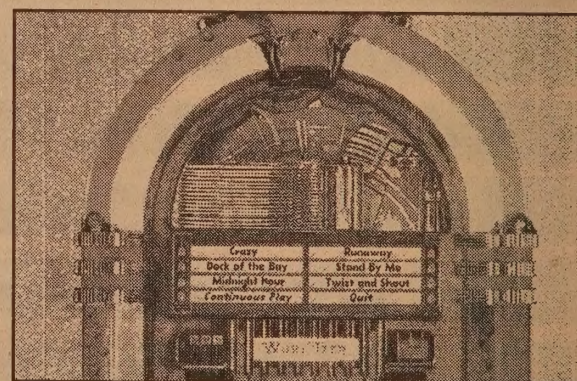
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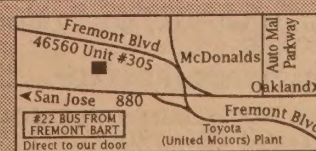
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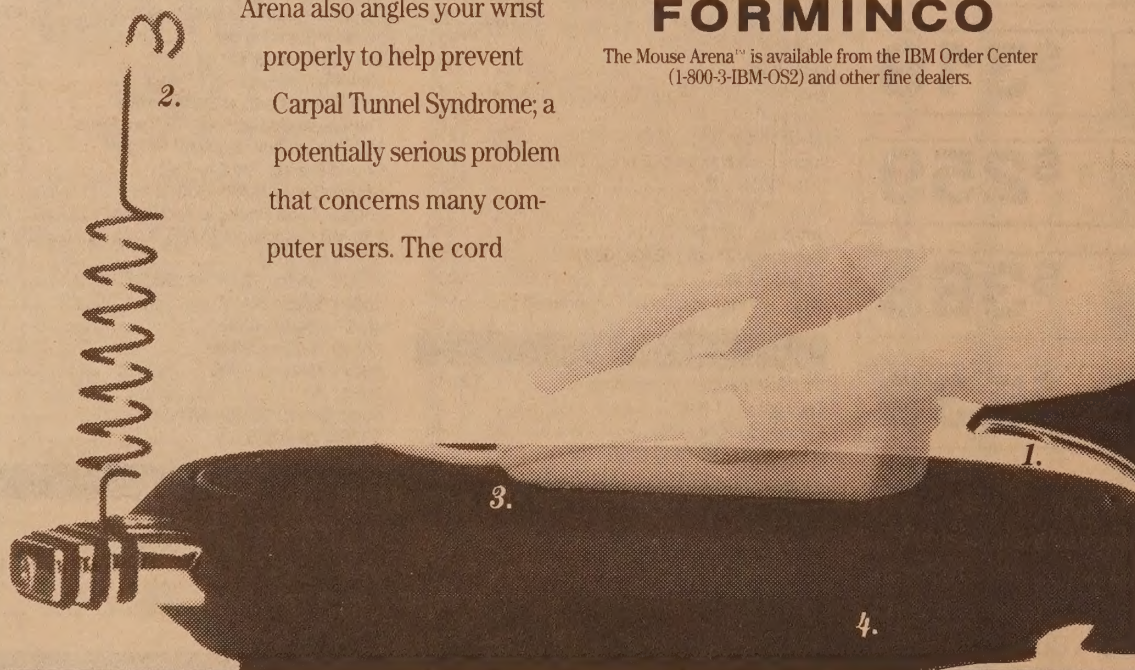
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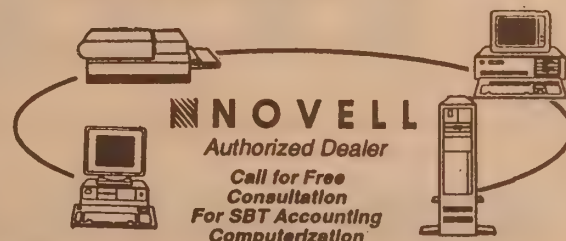
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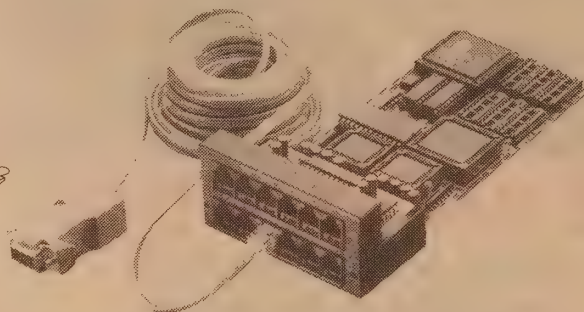
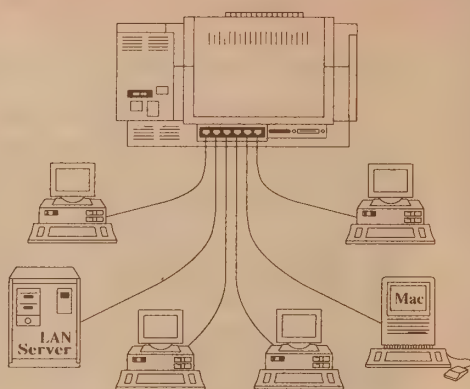
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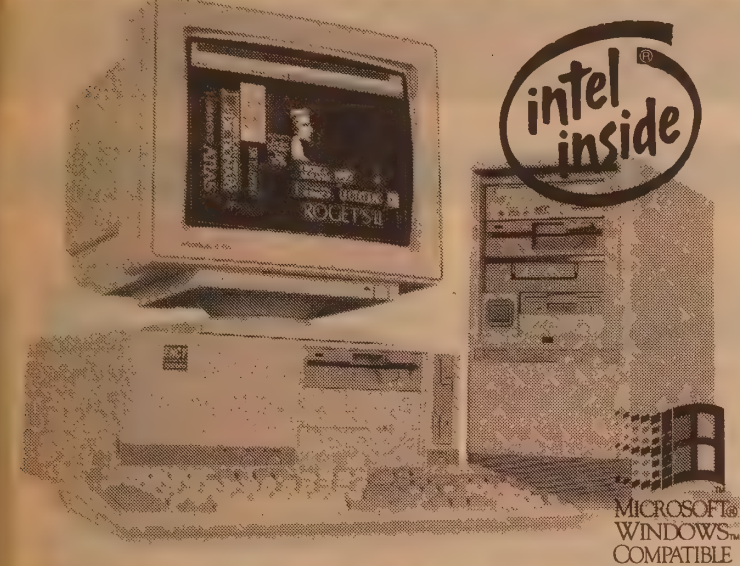
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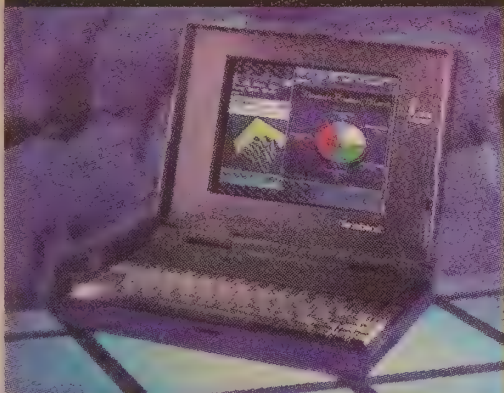
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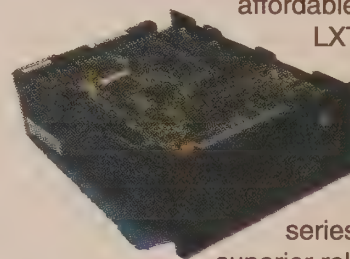


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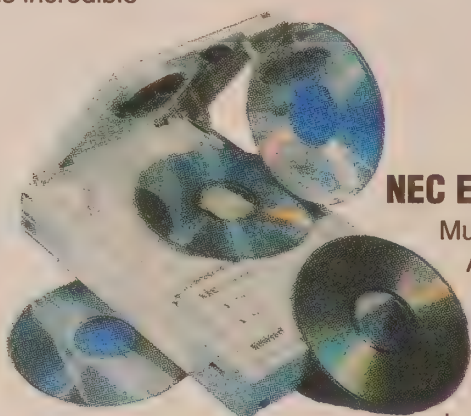
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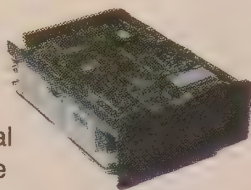


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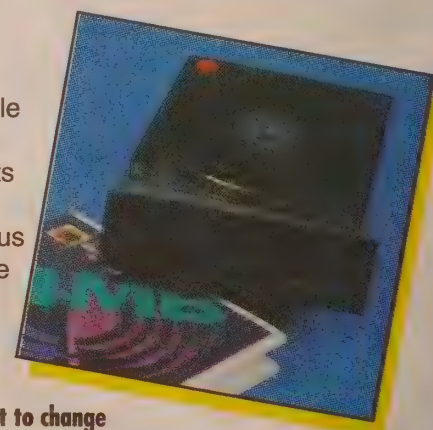
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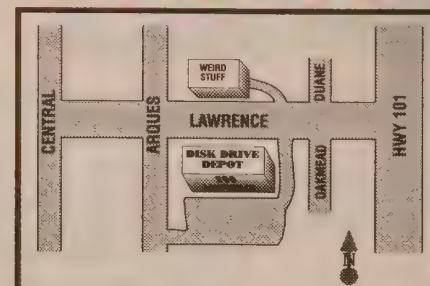
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INDUSTRY INSIGHT

Move Over Pens: HP Introduces Portable Communicator With Old Interface

BY PAUL
HOFFMAN

While the pentop market flounders for lack of sales, Hewlett-Packard released a new version of its keyboard-based palmtop with new communication features that will answer the desires of many portable customers. The new HP 100LX is the successor to the popular 95LX, and is much faster and more capable than its predecessor. Most important, however, is the fact that the tiny com-

puter comes with a copy of cc:Mail Mobile built in, making it ideal for users of Lotus' cc:Mail program who want to check their mail but don't want to carry around a laptop computer.

The 100LX weighs just 11 ounces and can easily fit in a jacket pocket. Although the keyboard is also tiny, the keyboard consistently got high marks in ease of use relative to other palmtops. The new model has a 9-pin RS-232 port so it can more easily be connected to modems and printers.

The inclusion of cc:Mail Mobile makes this computer a mini-gateway to your electronic mailbox (assuming that you are using cc:Mail). As such, it can be a great boon for those who can't stomach carrying around even a 4lb. notebook just to read mail. Even if you use your portable to write simple memos or spreadsheets, the 100LX may be of great interest because it also has Lotus 1-2-3 as well as a host of small applications built in. The new model is completely MS-DOS compatible, so you can

even load your own software on the system, assuming that the software doesn't take too many system resources.

The new system also has a PCMCIA slot for memory and modem cards. This is particularly useful on the 100LX because a card-sized modem can be added for not much more than the cost of a miniature modem, but adding almost no weight or size. However, PCMCIA modems do drain

the 100LX's two AA batteries reasonably quickly. The new 80 x 25 screen makes it easier to run a variety of programs without having to scroll

around, like you had to with the 95LX.

This barely new computer may be the harbinger for things to come on the portable scene. Instead of trying to dazzle potential customers with features like pen input or a flashy GUI, the 100LX is a solid, boring communications terminal that does not get in your way when traveling and is cheap (at \$750 list, you can expect to see it for under \$600 soon). While others flounder with systems that are certainly more interesting but not proven, Hewlett-Packard is doing well with established technology that gets better slowly and hits established markets with the features they want today.

DIGITAL HDTV FINALLY BREAKS THROUGH, PROMISES BETTER VIDEO FOR COMPUTERS

Instead of fighting to the end, the three primary design teams vying for the US-approved high-definition television (HDTV) joined forces late in May so that a

single proposal could be approved by the FCC quickly. For many years, many different standards have been considered by the FCC for the next generation of television, and the industry has suffered from the delay. Now, the three finalists have decided to combine the best of each proposed flavor for a single standard that will bring high-quality television and digital video signals into the home in about two years.

The reason the HDTV standard has been so contested is that it will be as big of a difference as color TV was to black-and-white. HDTV offers incredibly more clarity than today's television at not much more cost (after the first few years). Given the lack of breakthroughs in television technology that have reached the consumer, there has been a pent-up demand for the better pictures that HDTV can deliver.

Most important to computer users, however, is the fact that HDTV in the US will be all-digital, meaning that high-quality digital images will be transmitted into the home within a few years. Currently, it is difficult to get good-looking TV pictures in standard PCs due to the analog nature of the signals and the difficulty of translating those signals to good digital images. With digital HDTV, however, the conversion will be so easy that it is likely that the market for TV-within-a-computer systems will grow explosively.

The merged standard means that the FCC will have to only approve (or disapprove) a single proposal. It is very likely that the Clinton White House will put the approval on the fast track, allowing the sets to be delivered starting in 1995. At the same time, television stations will start buying HDTV transmitting equipment to put next to their current analog equipment and will start simultaneous broadcasting as the first sets are sold. Under the proposal, every TV



Copyright © 1993 by Paul Hoffman. All rights reserved. Paul Hoffman is an industry analyst who has been covering microcomputer technology for ten years. He can be reached on Internet (phoffman@well) or CompuServe (71545,346). He also writes popular microcomputer books.

station will have to broadcast in both spectra by around the year 2000, but it is likely that most will choose to do so much sooner to avoid missing potential viewers.

In the merged proposal, stations can choose to broadcast on the HDTV spectrum at different levels of quality, allowing them to spend less money on shows for

The American standard will make it more likely that home computer users will buy into HDTV, and that commercial stations will start to cater to computer users.

which the better quality would not pay off (such as news, rebroadcasts of old movies, and so on). Viewers may choose what to watch based on the quality of the image.

A common question over the past few years has been, "Why haven't the Japanese taken the lead here like they do in many other fields?" Due to strong corporate and political pressure, Japan standardized on analog HDTV, giving them quicker access to the market but much less value in the long run. The Japanese analog HDTV sig-

nal was as hard, or harder, to translate into digital computer images than current television signals.

The American standard will make it more likely that home computer users will buy into HDTV, and that commercial stations will start to cater to computer users by putting special data in their pictures that computers can use to control their TV. For example, MTV could easily program in the album and artist title a few seconds before the beginning of each video,

and your computer could be programmed to start your VCR when a video you hadn't seen by a long list of artists appeared. Further, TV stations could download huge amounts of text related to news shows at the same time as you are watching, allowing you to find out more about the show. Advertisers can even include product information or availability data in their ads. All of these can be easily captured by your computer, which by the end of the century may be simply an

extension of your television.

WINDOWS ON MAC AND UNIX, MAC ON UNIX AND WINDOWS: PORTING COMES OF AGE

The Holy Grail of programmers is to be able to write a program for one type of computer and easily get it to run on another type. If you watch the software market, you notice that only the largest software companies have the same program running on both Windows and the Macintosh, for example. The process of getting an existing program to run on another system, called "porting," has always been a black art. As user interfaces got more complex, porting became even more so. The average software user was the loser as they found that the best programs only ran on another type of system, or a desired program wouldn't run on theirs.

Announcements in the past month should help alleviate some of the problems, at least in the Windows, Macintosh, and UNIX industries. Apple, Microsoft, and

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486DX2-66/DX-40	\$1510/\$1350
486DX-50/DX-33	\$1460/\$1320
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535 MB HD	\$600	3 Button Serial Mouse ..	\$12
ViewSonic 15"	\$280		Subtotal from
ViewMagic	\$150	Downgrades: System Price	
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Diamond 24X	\$100	60 MB HD	\$30
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A map of the O'Toole area. The map shows a grid of streets. At the top is a horizontal street labeled '880'. Below it is a horizontal street labeled 'O'Toole'. To the right of 'O'Toole' is a vertical street labeled '101'. To the left of 'O'Toole' is a diagonal street labeled 'Montague'. Between 'O'Toole' and 'Montague' are two vertical streets labeled 'Charcot' and 'Brokaw'.

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486DX2-66MHz 128K w/Intel CPU	\$660
VESA LB 486DX-33MHz 256K w/Intel CPU	\$448
VESA LB 486DX-50MHz 256K w/Intel CPU	\$590
VESA LB 486DX2-66MHz 256K w/Intel CPU	\$690

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- AMI BIOS/Clock, Calendar
- 256K of Ultra-Fast Cache
- **4MB (70ns) Memory**
- 1.2MB & 1.44MB Floppy Drive
- **245MB IDE Hard Drive**
- 1:1 2H/2F IDE Controller
- 2 Serial, 1 Parallel, 1 Game Port
- **Genoa 32 Bit Local Bus SVGA Card w/1MB**
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- 101 Enhanced Keyboard
- Med Tower w/PS

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- AMI BIOS/Clock, Calendar
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- **16 Bit SVGA Card w/1M**
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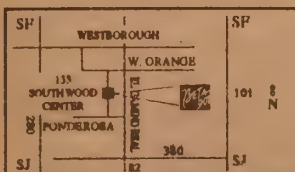
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- **AMD 80386-40MHz CPU**
- Landmark Speed = **65MHz**
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- 64K Ultra Fast External Cache (Expandable to 256 Cache)
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other major system software vendors have begun showing almost-working versions of porting software that either allow programmers to port much faster, or allow many programs to run on different operating systems unchanged. The result is that for any computer, the number and quality of programs may go up dramatically in the next year.

Although few of the technologies announced actually exist, they seem promising. The ability to run Macintosh programs under Windows, and vice versa, springs from the similarities in the two interfaces. When a programmer writes a program, he or she puts in statements that ask the operating system for certain user

interface features, such as the standard "Open" dialog box. If the way the programmer asks for such features is very similar on two different operating systems, such as the Macintosh and Windows, another program can intervene and make statements for one computer act exactly like the other computer wants. This additional program can either work with the programmer, allowing one set of statements to make two or more kinds of programs, or it can help the user run a program originally written for one kind of computer to run flawlessly on another.

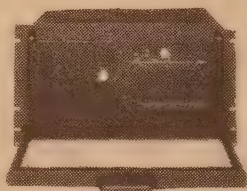
Sunselect, a spin-off from Sun Microsystems and UNIX Systems Laboratories have recently announced Wabi (Windows Application Binary Interface), a program that allows Windows programs to run unchanged on intel-based UNIX systems. According to the companies, programs run under Wabi run just as fast under UNIX as they do under Windows. For UNIX users, this will mean that they will have access to most (but probably not all) Windows 3.1 programs now available. Even though many Windows 3.1 programs have counterparts that were written to specifically run under UNIX, many more people are familiar with Windows programs such as Word for Windows and Excel. The program will probably be available early next year, according to the companies.

Similar situations will probably exist in the Windows and Mac worlds this year. Both Apple and Microsoft have been showing developers systems that allow them to change existing programs to work on the other system, and some smaller developers will also be selling such systems. Although Apple's system, called Bedrock, won't be ready until next year, Microsoft's system, code-named Wings, may be available this year. Apple has more to gain by keeping Macintosh developers from giving up the Mac altogether and going towards the much larger Windows market, of course, but Microsoft has acknowledged that many of its developers would like to crack the well-established Mac market too.

Although the act of porting is mostly of concern to programmers, the results are important to everyone. If Windows programs can run on UNIX systems, for example, current Windows users will be more willing to risk the transition to UNIX. If Windows programs can be run on the Mac, Apple can sell more Macs. Either way, Microsoft gains because Windows is the platform of origin, and can therefore sell more copies of Windows. ■

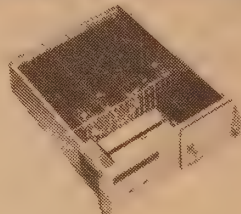
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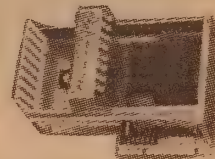
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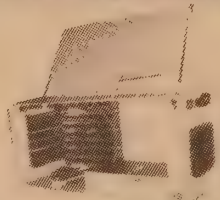
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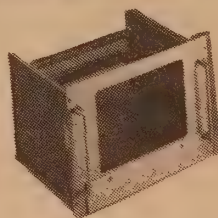
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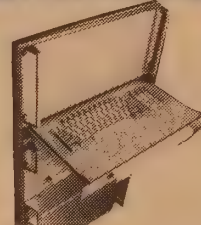
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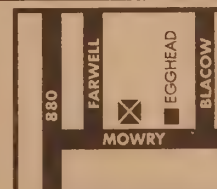
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MICROTIMES INDEX SURGES TO RECORD HIGH

Led by strong gains by Lotus, Symantec, and LSI Logic, to name just a few, the MicroTimes Stock Index took wing during the monthly trading session ended May 27.

When the books were closed on the four-week trading session, here is how our industry fared: the MicroTimes Stock Index, which monitors the financial health of the 32 stocks in the adjacent table, raced ahead 479.87 points, or 11.8%, en route to a new record high of 4554.5. In comparison, the Dow Jones Industrial Average also smashed through its previous record high last month, as it rallied a robust 129.71 points, or 3.79%, to an all-time high of 3554.83.

Lotus topped the leaderboard last month with a resounding 39.2% gain to \$35.50. The company's recently released 1-2-3 Release 4 for Windows continued to garner high accolades from the computing community last month. As a result, Lotus took largest percentage-gained honors of the lot last month.

Hewlett-Packard was another one of the leaders last month after it rallied 15.1% to close at \$84.88. The computer maker reported a better-than-expected second-quarter earnings report. The bottom line for the Palo Alto-based concern last month: earnings swelled to \$347 million from \$323 million last year thanks to a surge in demand for its computers and printers. Separately, Hewlett-Packard announced plans to buy BT&D Technologies, which manufactures high-speed fiber-optic components. BT&D was a joint venture between British Telecom (BT) and Du Pont (D). Terms of the agreement were not disclosed.

Intel charged ahead \$17 a share and was the largest dollar-gainer for the period. Merrill Lynch raised its 1994 earnings estimates by 19% last month to \$14 a share and said the stock still "looks very undervalued."

Even Sun Microsystems got into the act as it sprang forward 16.9% to \$31.13. A *Wall Street Journal* profile said the company now faces a delicate balancing act when it comes to marketing software based on its workstation's operating system while it faces increased competition in hardware sales. Potential competition from the Apple/IBM alliance, from Intel's Pentium chip, and Microsoft's new Windows NT may offer buyers machines that equal the power of a Sun workstation, but at a lower price.

EXCH	COMPANY	TICKER SYMBOL	CLOSING PRICE 04/29/93	CLOSING PRICE 05/27/93	NET CHANGE IN MONTH	PERCENT CHANGE IN MONTH	P/E RATIO	ANNUAL DIVIDEND RATE	ANNUAL DIVIDEND YIELD	ANNUAL HIGH	ANNUAL LOW
SOFTWARE											
OTC	Adobe	(H) ADBE	57.25	67.63	10.38	18.12	34	0.40	0.59	67.63	25.25
OTC	Aldus	ALDC	15.00	16.25	1.25	8.33	90	0.00	0.00	21.00	10.25
OTC	Autodesk	ACAD	40.25	50.75	10.50	26.09	26	0.48	0.95	56.50	32.75
OTC	Borland	BORL	22.25	25.88	3.63	16.29	-	0.00	0.00	54.50	17.50
OTC	Informix	(H) IFMX	37.50	45.00	7.50	20.00	27	0.00	0.00	49.75	12.13
OTC	Lotus	(H) LOTS	25.50	35.50	10.00	39.22	21	0.00	0.00	36.75	14.75
OTC	Microsoft	(H) MSFT	85.50	94.13	8.63	10.09	31	0.00	0.00	95.25	65.50
OTC	Novell	NOVL	29.25	29.50	0.25	0.85	32	0.00	0.00	35.25	22.50
OTC	Oracle	(H) ORCL	34.88	43.63	8.75	25.09	62	0.00	0.00	43.63	14.00
OTC	Software Publishing	SPCO	7.88	7.38	-0.50	-6.35	-	0.00	0.00	15.00	6.75
OTC	Symantec	SYMC	12.75	17.13	4.38	34.31	-	0.00	0.00	44.25	5.88
HARDWARE											
OTC	Apple	AAPL	50.75	57.38	6.63	13.05	14	0.48	0.84	85.25	41.50
OTC	AST Research	ASTA	13.75	17.00	3.25	23.64	10	0.00	0.00	24.25	11.25
NYS	Commodore	(L) CBU	4.38	4.00	-0.38	-8.57	-	0.00	0.00	12.50	3.50
NYS	Compaq	(H) CPQ	47.38	58.88	11.50	24.27	18	0.00	0.00	59.75	23.13
NYS	Digital Equipment	DEC	43.38	44.75	1.38	3.17	-	0.00	0.00	49.25	30.38
OTC	Dell	DELL	28.63	23.63	-5.00	-17.47	10	0.00	0.00	49.88	15.00
NYS	Hewlett-Packard	(H) HWP	73.75	84.88	11.13	15.08	25	1.00	1.18	88.88	50.25
NYS	IBM	IBM	48.88	53.25	4.38	8.95	-	2.16	4.06	100.38	45.88
NYS	Silicon Graphics	(H) SGI	32.50	36.75	4.25	13.08	-	0.00	0.00	37.38	16.13
OTC	Sun Microsystems	SUNW	26.63	31.13	4.50	16.90	26	0.00	0.00	41.00	22.50
NYS	Xerox	XRXX	75.38	75.50	0.12	0.17	-	3.00	3.97	88.88	66.75
NYS	Tandy	TAN	29.38	32.00	2.62	8.94	29	0.60	1.88	32.13	22.25
CPU'S											
NYS	Advanced Micro Devices	AMD	29.13	29.38	0.25	0.86	13	0.00	0.00	32.88	7.38
OTC	Intel	INTC	95.75	112.75	17.00	17.75	17	0.40	0.35	121.25	47.75
NYS	LSI Logic	LSI	10.63	13.63	3.00	28.24	-	0.00	0.00	14.13	4.88
NYS	Motorola	(H) MOT	72.25	82.25	10.00	13.84	33	0.44	0.53	82.88	37.13
COMMUNICATIONS											
NYS	AT&T	(H) T	58.13	61.63	3.50	6.02	21	1.32	2.14	62.38	40.63
NYS	BellSouth Corp.	BLS	53.13	52.00	-1.13	-2.12	16	2.78	5.31	57.50	46.75
OTC	MCI	(H) MCIC	46.88	52.88	6.00	12.80	23	0.10	0.19	53.63	29.88
NYS	Northern Telecom	NT	36.25	36.25	0.00	0.00	18	0.36	0.99	46.00	30.50
NYS	Pacific Telesis	PAC	46.25	47.38	1.13	2.43	22	2.16	4.56	49.38	39.25

KEY: NYS = NEW YORK ASE = AMERICAN OTC = OVER THE COUNTER
(H) = NEW HIGH REACHED IN PERIOD (L) = NEW LOW REACHED IN PERIOD

MARKET DIARY:

ADVANCES.....	27
DECLINES.....	4
UNCHANGED.....	1
NEW HIGHS.....	11
NEW LOWS.....	1

MOST ACTIVE ISSUES:

LARGEST DOLLAR GAINER.....	Intel.....	\$ 17.00
LARGEST DOLLAR LOSER.....	Dell.....	\$ -5.00
LARGEST PERCENTAGE GAINER.....	Lotus.....	39.22 %
LARGEST PERCENTAGE LOSER.....	Dell.....	-17.47 %

	CLOSE 04/29/93	CLOSE 05/27/93	NET CHANGE IN MONTH	PERCENT CHANGE IN MONTH
MICROTIMES STOCK INDEX	4074.63	4554.50	479.87	11.78
DOW JONES INDUSTRIAL AVERAGE	3425.12	3554.83	129.71	3.79
STANDARD & POOR'S 500 STOCK INDE	438.89	452.41	13.52	3.08
N.Y.S.E. COMPOSITE	242.48	249.43	6.95	2.87
NASDAQ COMPOSITE	658.45	704.59	46.14	7.01

DATE	MICRO TIMES	DOW JONES
10/23/92	3536.03	3207.64
12/10/92	3825.83	3312.19
01/11/93	4020.09	3262.75
02/05/93	4083.40	3442.14
03/04/93	4127.80	3398.91
04/01/93	4196.89	3439.44
04/29/93	4074.63	3425.12
05/27/93	4554.50	3554.83

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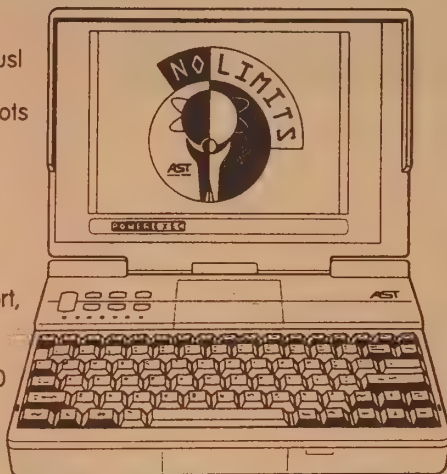


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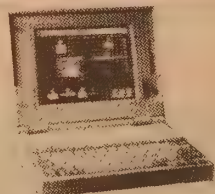
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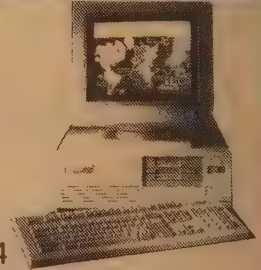


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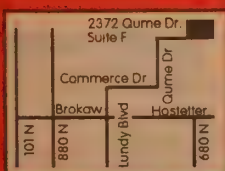
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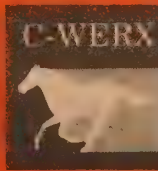
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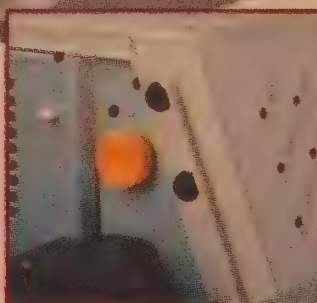
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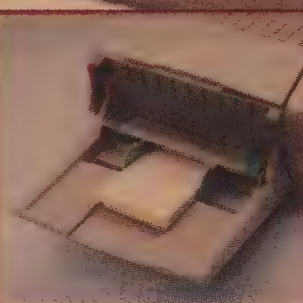
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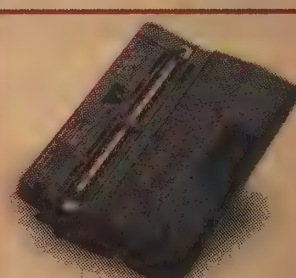
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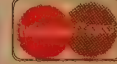
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It's Our Government; We Want In— Electronically

BY JIM
WARREN

Recently, this column has concerned timely, economical electronic public access to computerized public information—particularly legislative information. In March, a bill was introduced to make already-computerized legislative records available to the public by modem, Assembly Bill 1624 (Bowen, D-Torrance)—no implementation specified.

\$200 PER MONTH TO SERVE A MILLION+ CALIFORNIANS

In April, I proposed to the Assembly Rules Committee that AB1624 be implemented by making copies of legislative files freely available to the million-and-a-half or so

they do the *Sacramento Hustle*—truly, dancing with wolves.

CONFLICTS OF INTEREST?

The Legislative Counsel is the commercial vendor of a monopoly product. He runs the Legislative Data Center (LDC) and reaps the off-budget revenues from peddling legislative data. Last year, he charged 40¢ per kilobyte. This year, he granted himself a 25% increase. In 1992, he received \$375,413 from selling public files to “clients who purchased legislative data on a regular basis.” That’s only about 0.7% of his \$52.3-million budget. (Law book publisher Matthew Bender also paid \$178,773 for most of the state codes, but that was a one-time purchase.)

The Legislative

Counsel is also legal advisor to the legislators who by AB1624 might impact both his control over access and his off-budget profits.

In 1992, Legislative Counsel received \$294,921 from State Net and Legi-Tech, his two largest customers. In the same year, the state’s Department of General Services paid State Net and Legi-Tech \$285,289.85.

The League of California Cities and California State Association of Counties (CSAC) buy online access from State Net and sell it to their members—tax-funded cities and counties. Reportedly, CSAC and the League each reap about \$30,000 annual profits from those sales.

Sample fees to citizens: Legi-Tech—\$175/hour; State Net—\$4200 for 2880 minutes under a 24-month contract.

Legi-Tech is owned by the publisher of the politically powerful *Sacramento Bee* and *Fresno Bee*. State Net owns the *California Journal*, and their executive VP is deputy

chief of staff to Governor Wilson.

Prior to May 24th, Burton and other legislators insisted that anyone receiving electronic public records and redistributing or publishing them for a fee had to contract with Legislative Counsel and (undoubtedly) pay a fee. That would include newspapers and magazines.

9.6 = 19.2 = 1544.0

How to link to the Internet? The state’s central data-processing facility, Teale Data Center, is already connected to the Internet by a T-1 line, a 1.544Mbits/sec link (1544Kbits). On April 9th, the LDC director told Ms. Bowen’s aide and me that LDC had a 9600-baud data line to Teale (9.6Kbits).

On April 23rd, legislator Bowen asked her attorney, Legislative Counsel, “What is [the LDC to Teale] line used for precisely?” and “What is the cost of a 9600-baud line from LDC to Teale Data Center ...?”

On May 4th, I faxed my 16-page plan—assuming the 9.6Kbit line—to Bowen for Burton, and to the LDC director and his coordinator.

On May 11th, Legislative Counsel told Bowen, only, that they had a 19.2Kbit line to Teale (an innocent 2X error). Its yearly cost is \$1029.60 and is “used for sending email messages between the executive agencies and legislative offices, and for downloading data files from Teale to the LDC for use by legislative committees [for example budget data needed by the fiscal committees during budget hearings].”

On May 13th, I discovered through an outside source that LDC was installing a T-1 Internet connection. Legislative Counsel requested it in the week of May 3rd—the week before his letter to client Bowen. It was completed May 14th, including a top-of-the-line Cisco router.

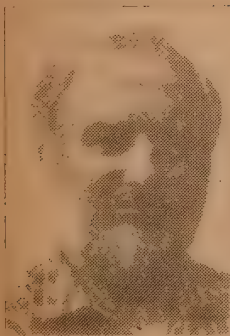
REALIZABLE FANTASIES

computers connected to the Internet—the largest of the nonprofit, nonproprietary public computer networks. About seven hundred thousand to a million Californians (and ten to twenty million people worldwide) now use Internet-connected computers at work, school, or home—either directly or through its links to CompuServe, AOL (America Online), GENie, Delphi, Applelink, Fidonet and MajorNet BBSes, etc.

At the request of Committee Chairman John Burton (D-San Francisco), I drafted an implementation plan that would allow all Internet computers to anonymously copy all public legislative files. Its one-time costs are about \$7000 for a file-server and Internet link, and about \$200 per month—making the files available to BBSes and host computers statewide and worldwide.

Two hundred dollars a month to give perhaps a million Californians free, timely, useful access to the process of their governance.

With that proposal I began learning how



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NEWS & VIEWS

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My May 4th proposal which Bowen had adopted focused on using the Internet. Internet access was clearly Bowen's reason for asking about the LDC-Teale connection. But her Legislative Counsel never mentioned his new Internet link, able to carry 160 times more traffic than the 9.6Kbit line they first specified. When I asked, so I could correct my report, they only asked how I heard about it and suggested I ask Bowen. I did; she'd never heard of a T-1 line.

A T-1 LINE FOR LAWYERS?

The issue is open process and the public's right to know what their government is doing and planning. I explicitly requested and was explicitly refused information about what computer or uses they are planning—regardless of any report Burton had requested.

Similarly incomplete, a May 24th Assembly Office of Research (AOR) report to Burton said, "LDC indicated they are already connected to Internet for use by Legislative Counsel lawyers."

193,000 characters per second, just for their lawyers?!!

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Their legislative system includes a constituent tracking program that can pull up the (public) voter registration of a caller or writer at a keystroke. Various staff say they rarely if ever use it. One said he didn't even

know about it—then said they used to go to microfiche for that information.

The May 24th AOR report proposes auditing "how many general public users accessed Legislative Information in [a] first year pilot test..."

If Legislative Counsel retains central control of individuals' access, other information about each user can easily be added to the voter registration data.

The AOR report also states that Legislative Counsel wants to "establish reasonable checks and balances to avoid the possibility of a user downloading the entire data file for resale." So much for citizens, libraries, or universities indexing or cross-referencing complete legislative files.

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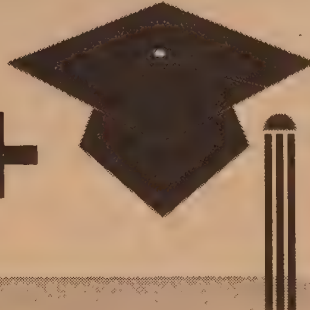
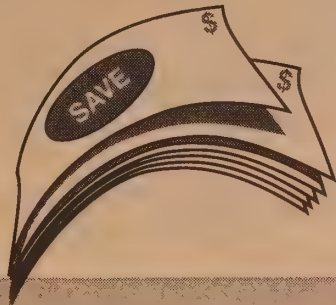
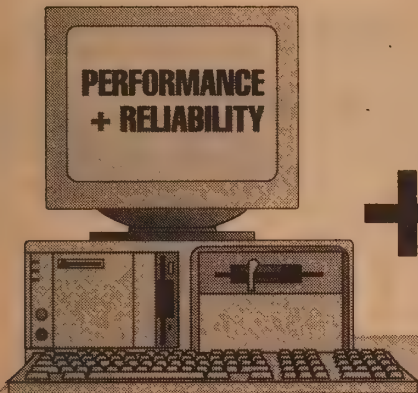
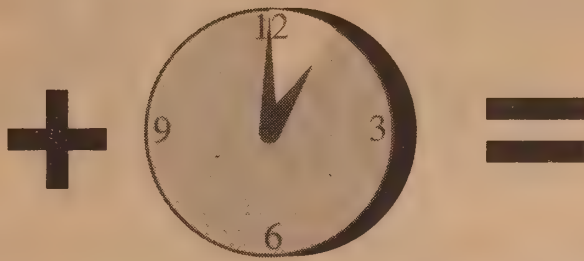
THE HORSE'S MOUTH

This writer often speaks on technology, government, freedom and privacy, and also about personal computing's history and futures. On June 18th, he will be the banquet speaker for the Ohio Libertarian State Convention. He will speak at the Association of Area Business Publications' national convention in San Francisco at the Fairmont on June 28th, and at the BBScon '93 convention in Colorado Springs, August 25-29 (303/693-5253). ■

Warren founded InfoWorld, Wireless Digital, Initiative, Inc., and one of the nation's largest public microcomputer conventions. He was founding host of PBS's Computer Chronicles, founding editor of Dr. Dobb's Journal, and has chaired various trade and professionals' organizations. He holds graduate degrees in computing (Stanford), medical information science (UC Medical Center), and mathematics & statistics. He has been a computer professional since 1968 and was a mathematics teacher and professor for ten years before that.

He organized and chaired the landmark First Conference on Computers, Freedom & Privacy (1991) and received one of the first Electronic Frontier Foundation Pioneer Awards (1992). He is a member of the board of directors of Autodesk, Inc., and also chairs the Communications Committee of the California Public Records Act Reform Coalition.

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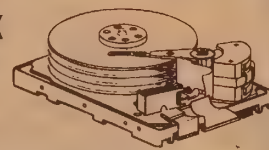
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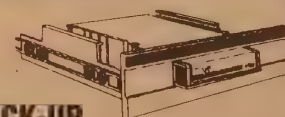
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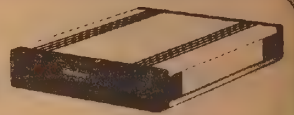
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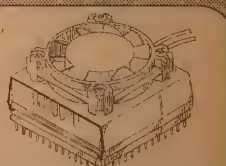
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The HP 100LX is Hewlett-Packard's new version of its ever-popular DOS palmtop, the HP 95LX. Selling for a street price of around \$750, it represents excellent price/performance. By keeping the exact same size and shape (also known as "form factor") as the original 95LX, the 100LX represents a great increase in functionality and usability without a corresponding increase in size or weight.

In particular, the new machine sports an LCD display that shows a full 25 lines by 80 characters of text and CGA resolution graphics. The built-in applications have all been totally reworked, making them much more user-friendly and powerful than those in the 95LX. The machine still comes with all of the usual personal information manager applications (address book, world time, memo pad, etc.), and Lotus 1-2-3 v2.2 as well (complete with graphing), and they have all been considerably improved.

From the outside, the machine looks almost exactly like the 95LX, which brings

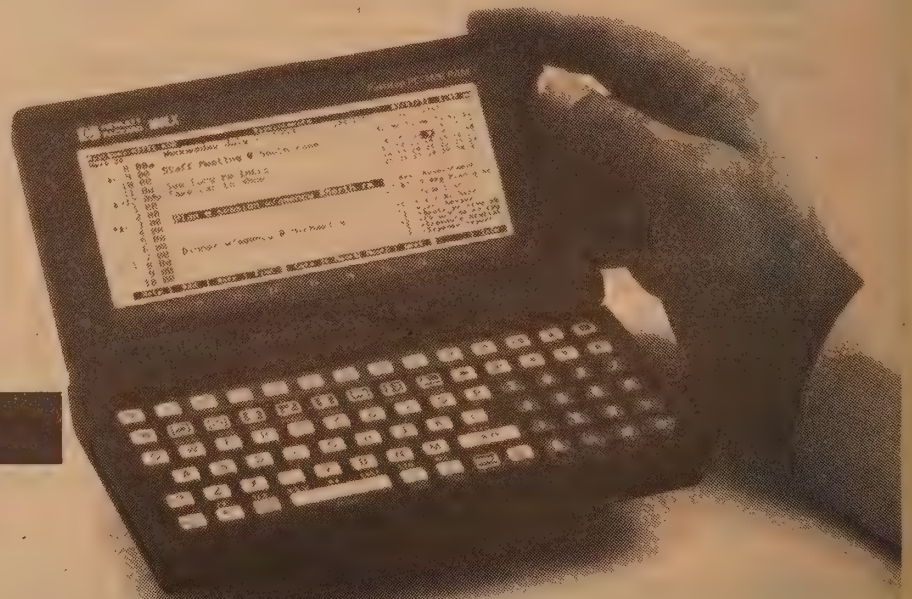
Will The Real 100LX Please Stand Up?

Happily, when I received my working 100LX, it seemed quite sturdy and up to HP's usual standards of quality.

The most impressive thing about the unit has to be its display. Though exactly the same size as the original 95LX LCD display, this one can show you a full screen of DOS text. Larger fonts can be used as well (and are often used by many of the built-in applications), since in the full-size 25 x 80 mode the machine uses a very small

number of the built-in productivity applications at the same time, while leaving enough extra space for a 352K RAM disk (you can increase the size of the RAM disk, but you cannot decrease it). The keyboard is very much the same as the 95LX—just about large enough to be able to type quickly, but not big enough for most people to touch-type. With enough practice it is quite possible to get up a pretty good typing speed on this machine.

Even with a megabyte of RAM, the largest amount of RAM I could manage to



PENS AND PALMTOPS

me to a rather strange part of the story. In the process of procuring a machine for this review, I initially received one that did not function properly. As it happened, though the inside of the case read "100LX," the boot-up display read "Welcome to the HP 95LX." The screen had a small crack in it, and several keys did not function. After a little further investigation, it turned out that the external case appeared to be a 95LX case, despite the gold "100LX" lettering on the inside cover. Very odd. Needless to say, I returned that machine and got another one for this review.

(though still quite readable) font. However, this display is very sharp, high-contrast, and readable from almost any angle. The text font is quite pleasant to look at (far nicer looking than the font used in the older 95LX, for example).

The base unit comes with 1MB of RAM, which makes it much more powerful and functional than the 512K 95LX. One megabyte of RAM allows you to run quite a

configure for the DOS session was about 375K. The SETUP program allows you to configure DOS with up to 512K of free RAM, however. So presumably with a RAM expansion card you could run DOS programs that require up to 512K. A PCMCIA 2.0 slot is provided, letting you plug in the most recent PCMCIA expansion cards, including fax modems, SCSI interfaces, Ethernet cards, and so forth,

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which should be compatible with the 100LX since it also has a full-screen display, and therefore can run any ROM-based DOS software contained in these cards. With a SCSI card, for example, you could attach a SCSI hard disk to the machine, at least in theory; or with an Ethernet card, plug your 100LX into your LAN.

The user interface to this machine has been considerably improved, with a Windows-like menuing system which is consistent among all applications (except for Lotus 1-2-3). Just a press of the MENU key, and a menu bar appears. The menu bars are complete with a Help menu, placed just as in Windows applications. Though the help feature is not very context-sensitive, it is possible to use the machine without opening the manual, since most of the functions are explained quite well in the online help. Dialog boxes, pop-up windows, and other graphical features enhance the style and appearance of the unit, giving it a much more professional look than the 95LX, which tended to use plain text-mode for its user interface. The World Time function on this new unit comes with a map which shows you the locations of many cities around the world, for example.

The built-in applications include a calendar/scheduler, an address book, memo pad, HP calculator (complete with graphing, financial, and solving capability), world time, Lotus 1-2-3, cc:Mail, a note taker, a database program, a stopwatch, a terminal program, a file manager, an application manager, and a DOS prompt (from which you can run DOS applications). The applications manager allows you to run programs from either an iconic interface or a text interface.

One minor annoyance with this machine is that when you run an application, it typically stays in memory when you switch to another app. Thus, if you keep switching from function to function without quitting your

other applications, you will fill up memory with quiescent programs. Therefore, it is generally a good idea to "quit" an application before changing functions. It would have been nice if you could set up some of the applications to automatically save and quit when you switch to another, to avoid having to press three keys to switch applications (MENU, Q for quit, then the other application key). However, the machine will allow you to run a DOS prompt even if there are other apps running, as long as there is enough memory to do so. This is convenient if you have a simple utility or something you'd like to run without

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having to exit all your other applications to do it.

The 100LX is evidently designed not only as a personal information manager, but also as a personal communicator. The cc:Mail application allows you to send and receive electronic mail from cc:Mail hosts, which simplifies the process of handling your email. You can compose email off-line, connect briefly and retrieve your email, then read it at your leisure. The telecommunications terminal program provides standard terminal emulation capabilities, including X, Y, and ZMODEM file transfer protocols at speeds up to the full serial port capability of 115,200 bits per second.

This machine, like the 95LX, was designed primarily as a computational and note-taking device. Though the graphical user interface is much improved, the memo pad still does not support multiple fonts, though it does support

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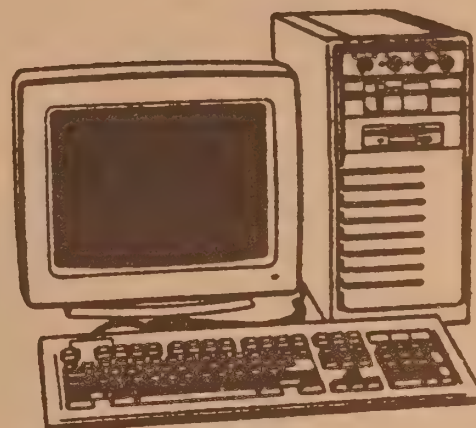
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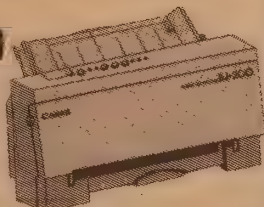
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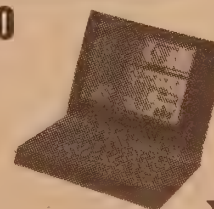
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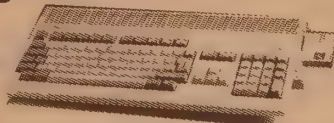
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boldface and underline styles. So you aren't going to use the 100LX as a word processor, but it works fine as a note-taking device and text editor.

The database and address/phone book features are very powerful and flexible, and after a little bit of investigation, quite easy to use. You can search the databases for text appearing in any single field or anywhere in any field, either case sensitive or insensitive. The database is fully configurable, allowing you to add or change field names and sizes of where they appear on the data-entry form. After just a few minutes of playing with the database program, I was able to change field names, move them around on the form, and so forth. The database program comes with a sample "restaurant database" file, to give you a flavor of what is possible with the flat-file database. The other built-in applications are similarly well designed, and generally easier to use and more convenient than their 95LX counterparts.

Lotus 1-2-3, of course, remains one of the more powerful aspects of the 100LX. The primary improvement here has to do with the larger screen size (you can toggle between two font sizes). You can see much more of a spreadsheet on the 100LX than on any other palm-sized computer I've used before.

Overall, this is a very impressive update to an already very popular machine. Though at \$750 it remains one of the more expensive palmtops, the power and flexibility of having a full 25 x 80 screen in a pocket-sized device has made the 100LX a very popular machine already; I had a very difficult time getting a hold of one for this review. HP claims that by the time this review is published it should be relatively easy to get one. Of course, the market situation may change drastically with the advent of the Apple Newton, which should be hitting the shelves soon (see below). However, at present, HP is currently selling one of the more powerful and well-designed palmtops on the market today.

Pen News And Rumors

•Apple is currently saying that it's planning to ship the Newton this summer. Rumor has it, however, that the machine is going to be very close to the \$1000 price point (rather than the "well under \$1000" they were quoted as aiming for last year). More on this developing story in next month's column.

Though at \$750 it remains one of the more expensive palmtops, the power and flexibility of having a full 25 x 80 screen in a pocket-sized device has made the 100LX a very popular machine already.

•AST Research is releasing the PenExec "PenTop," a pen-based computer built on the technology of the GRiD Convertible which I reviewed in this space a few months ago. As you may recall, the Convertible is a hybrid pen computer which includes a laptop-style full-sized keyboard. The machine weighs 5.5lbs and comes in an 11.6" x 9.4" x 1.6" case, much the same size and shape as a traditional notebook computer. The target price is "under \$3000."

AST's specific contribution to this machine includes an extended life battery (providing up to three hours of continuous operation), PCMCIA support, 200MB hard drives, and RAM expansion to 20MB. AST will also be providing support and service for the machine; because of its existing reseller and distribution channels, it will be able to send the Convertible and accessories out to a much larger number of sites than GRiD was able to do on its own.

•In a related announcement, Slate Corporation will be publishing AST Pen Essentials, a package of pen software applications and accessories tailored for the AST PenExec. The application set includes LooseLeaf Notetaker, Delrina WinFax Pen, Day-Timer Pen Scheduler, and PenBook Business Reference Pages. A

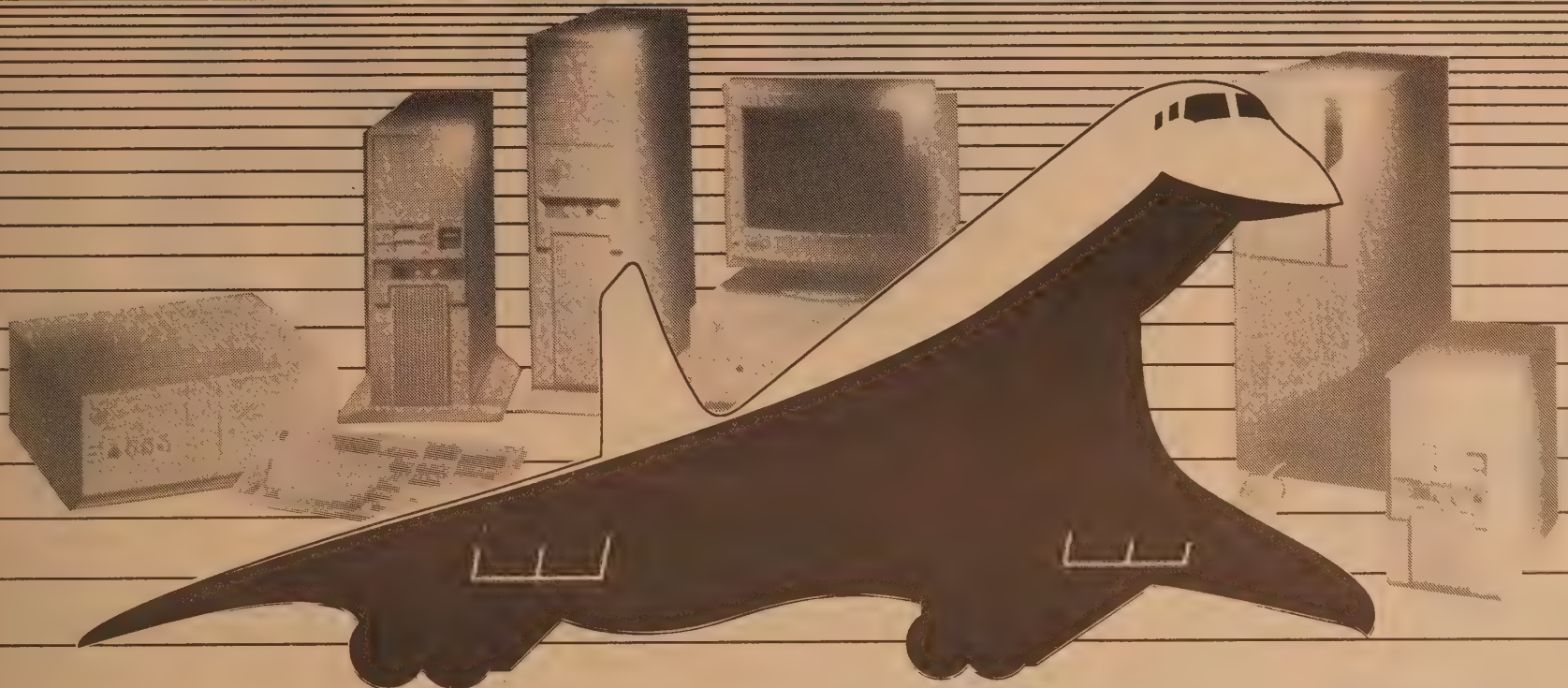
demo version of this package will be shipped with every AST PenExec computer.

•EO, Inc. has announced that it is now shipping the EO Personal Communicator 440 in volume. The EO Personal Communicator 440 is based on the AT&T Hobbit low-power RISC processor, and it includes networking and email software. The operating system is GO Corporation's PenPoint. No price was available at press time.

•IBM has announced its second-generation pen-based tablet computer, the IBM ThinkPad 710T. The 710T features either a Type III and a Type II PCMCIA slot, or three Type II PCMCIA slots. A 60MB hard drive which can fill one Type II PCMCIA slot is an option, and comes preloaded with either PenPoint or PenDOS. The machines use the IBM 486SLC/25 MHz processors. Battery life is projected at 3.3-4.1 hours. Price is \$2999 for the 5.5lb. unit without hard drive, and \$3599 or \$3699 for the 5.8lb. 60MB hard disk version, preloaded with either PenDOS or PenPoint, respectively. Set-up, service, and usage assistance are available from IBM during the warranty period through the IBM Personal Systems Help Center. ■

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From time to time, a really different notebook computer comes to market. Canon's NoteJet 486 is such a machine. Not only is this a well-designed 25MHz 486, but it is the only laptop that includes a built-in bubble jet printer. The NoteJet may bring to mind the old word processor machines that included a printer, but this looks nothing like those older units. In fact, this laptop looks pretty much like any other 7.7lb. portable—the top opens to expose the screen and keyboard. The basic system comes with 4MB of memory—expandable to 12MB—and uses standard off-the-shelf SIMM modules that you can buy anywhere and install yourself.

This is one of the best thought out machines I have seen. While it seems like only a minor step forward to include a printer, I see this as a significant leap ahead. The possibilities presented by this innovation are far greater than you might imagine at first glance. But before I get ahead of myself, let me describe how Canon has built a printer into the computer. The keyboard, which is less than a half inch thick, lifts up to reveal the sheet feeder that holds up to ten sheets of standard letter size paper, A4 paper or transparencies. It will not, however, print envelopes.

For the first time, the user is no longer dependent upon finding a compatible printer or lugging one along in order to print out a few reports or letters. As a friend suggested to me, this computer now offers the advantages of carrying along a typewriter because you can always print out what you entered into the machine. But beyond this, Canon has come close to creating the perfect paperless office machine. By adding one of the optional fax modems, you can receive faxes and print them on plain paper wherever you are. And, of course, you can fax off documents you have assembled. The next step, will be to add a scanner, giving full faxing and scanning capabilities in a portable. When

Canon does this, they will have created the true portable office.

But before we enter into the stratosphere, let's examine the machine in more detail. There are three different capacity hard drives available. The least expensive configuration (\$2,499) has an 85MB hard drive. Canon also offers configurations with 135MB (\$2,799) and 180MB (\$2,999) drives.

The display is a 9.5" VGA

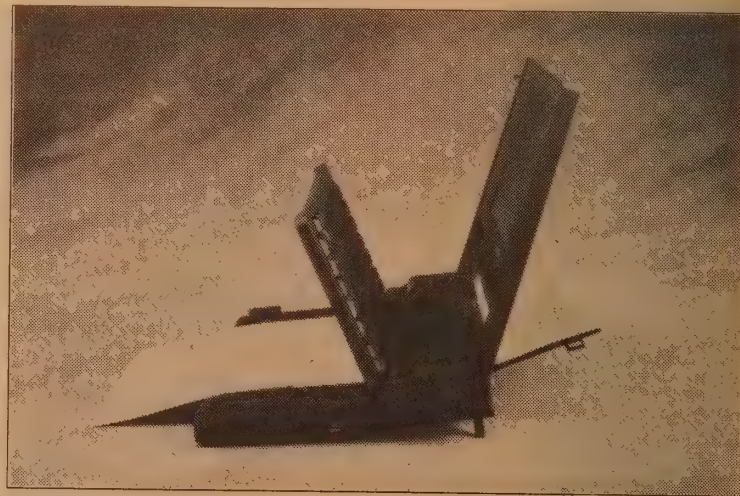
monochrome backlit screen that shows a clear and crisp image in sixteen scales of gray. It is adequate for Windows 3.1, which is included, but certainly not as convenient as a color display. A color monitor can be connected

through the built-in video port on the back of the notebook.

The keyboard features a well-designed layout with separate keys for cursor movement as well as PgUp, PgDn, Home, and End. Although I find this keyboard quite acceptable, partly because of the slightly larger size of the overall computer—10" x 12.2" x 2.25"—some users might prefer to add the optional numeric keypad (\$100) and avoid using the embedded numeric keypad. Canon has included a pointing device they developed as an alternative to a mouse. It looks like a pen with a ball and buttons. I am not wild about it, but perhaps I will grow to like it after using it longer. The advantage is that you can hold and operate it in one hand, without the need for a flat surface. You turn a ball with your thumb and click the buttons with your fingers. On an airplane, I am sure I would really appreciate this convenience. The device plugs into the PS/2 port on the back of the computer. If

you use a numeric keypad, it plugs into this same port and the mouse then plugs into the keypad. The drawback to this arrangement is that you do not have the option of attaching a standard keyboard. As far as I am concerned, this is the only design feature on which I can fault Canon.

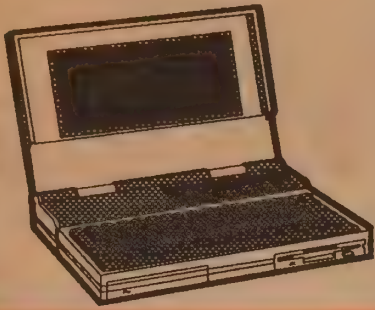
In addition to the other ports I have mentioned, there are both a serial and a



parallel port on the back of the unit. There is also a bus connector for a docking station. The station is not currently available so I have neither price nor description. While it might seem that there should be additional serial port, there is the built-in mouse port and it is possible to use the parallel port for a variety of other devices. The parallel port will allow you, for instance, to use SCSI devices such as CD-ROMs, additional hard drives, and tape backup units. There are also two PCMCIA slots. This computer is ideally set up so you can do a variety of jobs without feeling hampered.

The PCMCIA slots will let you install both a network card and a fax modem at the same time. Canon offers two fax modem cards. The standard model (\$399) is a 2400/9600 baud fax modem while the deluxe model (\$899) transmits at 14,400/9600 baud. They both come with software.

The NoteJet has all of the features you
continued on page 86



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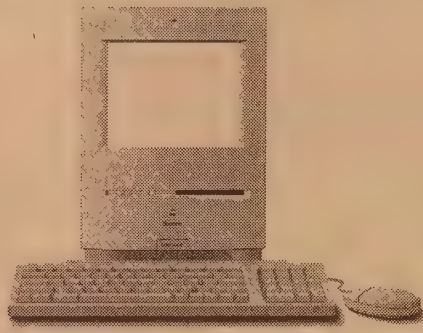
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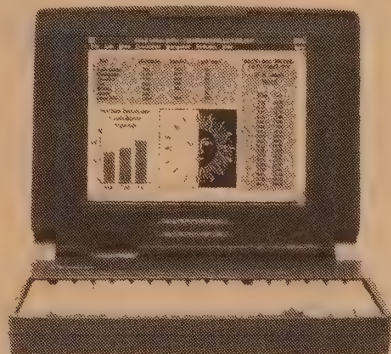
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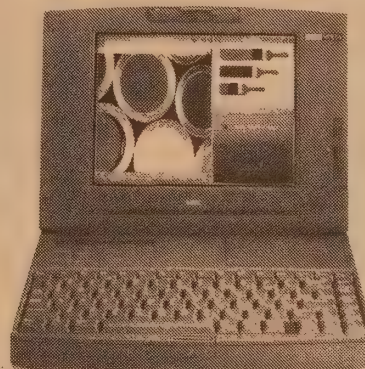


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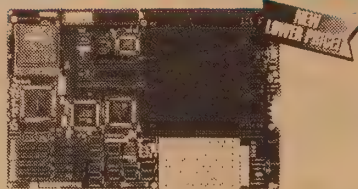
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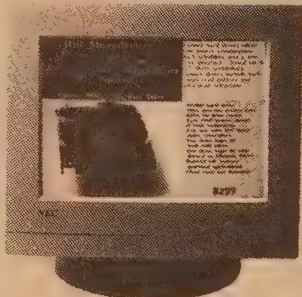
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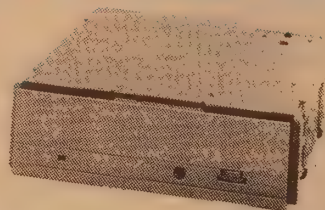
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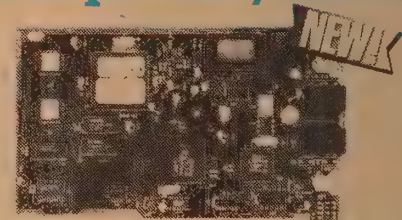


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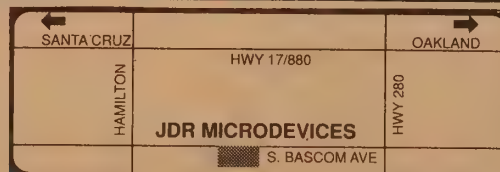


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Telecommuting Continues To Gain In Popularity

Activity In The World Of Telecommuting Continues To Heat Up

BY ROBERT
MOSKOWITZ

LOS ANGELES CITY WORKERS MAY BEGIN TO TELECOMMUTE

A recent survey of Los Angeles city employees has reportedly found that nearly sixteen thousand of them could become telecommuters, nearly one-third of the hard-pressed city's work force. Putting this many people on a telework schedule would save a significant amount of travel, and make a major dent in the Southland's traffic and air pollution problems.

Although Los Angeles' decision-makers have only just received the report and have not yet come to grips with this challenge and opportunity, the information is due to be made public any time now, and should provide a treasure trove of factual material on which to base the debate that will surely ensue.

CALTRANS/UC DAVIS "RESIDENTIAL CENTERS" LOOKING FOR SITES

Another project still making progress is the CalTrans/UC Davis effort to open as many as a dozen neighborhood telework centers. Unlike all existing centers, which are located in office-type settings where people arrive in cars or on busses or trains, this project is geared to utilize locations within half a mile of residential areas. The hope is that people can walk to work (in this case, to "telework") as they did forty or fifty years ago, and totally eliminate their job-related transportation requirements, except perhaps for a bicycle.

Site selection is already underway on

this project, and apparently none of the sites will be in large cities. Most of the sites will reportedly fall within the corridor along I-80 from Vacaville to Grass Valley, and also within Orange and San Diego counties.

This project is particularly interesting

NOT YET MADE PUBLIC, THE TELECOMMUNICATIONS

FOR CLEAN AIR REPORT IS SAID TO ESTIMATE THAT

EACH YEAR GOVERNMENT WORKERS IN JUST LOS

ANGELES, ORANGE, RIVERSIDE, AND SAN DIEGO

COUNTIES SPEND ABOUT \$1 BILLION OUT OF THEIR

OWN POCKETS FOR "TRAVEL TO WORK" FROM HOME.

because it reverses the more common pattern of first building a telework center and then hoping people will come use it. Instead, the CalTrans/UC Davis team will identify likely teleworkers in well-situated residential areas, get them motivated and get their employers to accept the notion of telework, do the necessary training, and only then open a center to serve what by then will have become a committed population. The team anticipates its effort to recruit teleworkers will be the most active of any telework center development project to date.

This approach sounds very expensive, but according to Jack Nilles, lead consultant on the project, experience with the productivity improvements that typically result from getting people to start telecommuting are so large that the cost of recruiting the workers and setting up the centers

will be recovered in less than a year. "And from then on," he says, "these people will probably continue telecommuting for the rest of their working lives."

According to Nilles, a mid-level executive who begins telecommuting one day a week will normally increase his productivity five or ten percent over the year.

That's like getting an extra \$3,000 to \$6,000 worth of results, and it's even more if you factor in the employers'

normal employment overhead, fringe benefits, and the costs that can be saved by time-sharing the need for certain office space. The total savings goes even higher if you

consider the personal (and societal) savings realized by having that executive not travel to work one day per week.

METROPOLITAN WATER DISTRICT EXPLORES TELECOMMUTING OPTION

The Los Angeles Metropolitan Water District has jumped into the pool with a telecommuting development program targeted for forty to sixty employees. One day a week some of these people are working at home, others are working at an MWD site that happens to be closer to their home than the office to which they normally commute.

Right now, San Dimas is the most popular satellite location for Los Angeles County MWD telecommuters. Although it's increasingly common for companies and government agencies to offer satellite facilities (that is, facilities wholly owned by the employer) to their telecommuters, fairly soon the project to do formal site-match-



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ing between different government agencies will begin. Since cities no longer require their employees to live within their boundaries, there is a tremendous potential to have employees of various California government entities telecommute to an office that happens to be closer to home—even though it belongs to a different government entity. Look for more up-to-the-minute word of this project's progress in one of the next articles in this series.

SUBSTITUTING TELECOMMUTING

FOR TRAVEL JUST TO THESE INTER-

GOVERNMENT MEETINGS COULD

SAVE ABOUT \$50 MILLION PER YEAR.

THE WHOLE WORLD IS WATCHING

In the past year or so, the whole world has begun watching the progress of American—and particularly Californian—telecommuting programs to see how they can replicate these successes in their own countries.

In Singapore, telecommuting has won much greater acceptance than many other locations because people there hate to take

time for travel. The island is dotted with high-density apartment buildings, many of

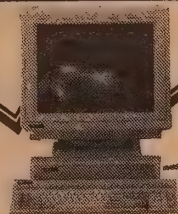
which have telecommuting centers built right into the "village center." This allows people to do their jobs at least some of the time without traveling to downtown Singapore, which can take an hour or more by bus or train. Singapore companies are also starting to export their jobs to Malaysia via telecommuting. They are finding, as others have found before them, that the electronic cost of "moving the work instead of the worker" is minimal compared with

the value of the work actually being accomplished.

Separately, the French government in cooperation with France Telecom and its data transmission arm (DATAR) have committed the equivalent of nearly \$7.5 million to set up various telecommuting programs in the southern part of that country. The main problem being addressed is that thousands of young people graduate from schools every year with computer skills and training, but can't find local jobs. Meanwhile, computer-oriented jobs go begging in the city centers. The result has been a steady migration of young people toward the already overcrowded metropolitan centers of France.

By installing telework centers in relatively rural and small-town areas and offering telecommuting possibilities to the young people already living there, the French government hopes to synergize the benefits of telework with rural economic development to restructure the way work is done

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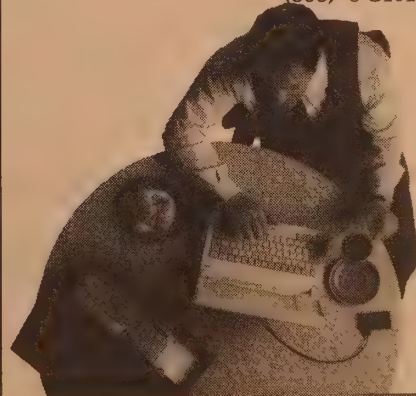
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in that country.

A few months ago, we described a similar—but far smaller scale—effort directed at California's Paiute Indian Reservation in Bishop. A clear trend is being established, and we expect many more such projects to come to light in the months and years ahead.

HOME OFFICE TECHNOLOGY SHOW SCHEDULED FOR SAN JOSE IN AUGUST

More than fifteen thousand telecommuters and people using home office technology are expected to attend the Home Office Technology and Exposition scheduled for

August 24th and 25th at the San Jose Convention Center. This is one of the first expositions and conventions to focus on the twin topics of telecommuting and working at home. Admission is free.

Unlike most such conferences and expositions, which tend to emphasize technology and computer devices, this show is attempting to bring together speakers, telecommuters, and company decision-makers in a way that de-emphasizes equipment and promotes the increased acceptance of this method of accomplishing work.

There's also a Telecommuting Management Conference with speakers and consultants (possibly including your intrepid reporter) offering useful information on how to move a company toward a successful telecommuting environment. The educational "tracks" around which presentations are organized will include: Telecommuter Empowerment, Home-Based Business Solutions, Products for the Home Office Market, and—for vendors in attendance—Marketing to the Home Office Buyer.

For more information on either conference, contact: Future Expositions at (408)369-7744, or fax them at (408)369-1065.

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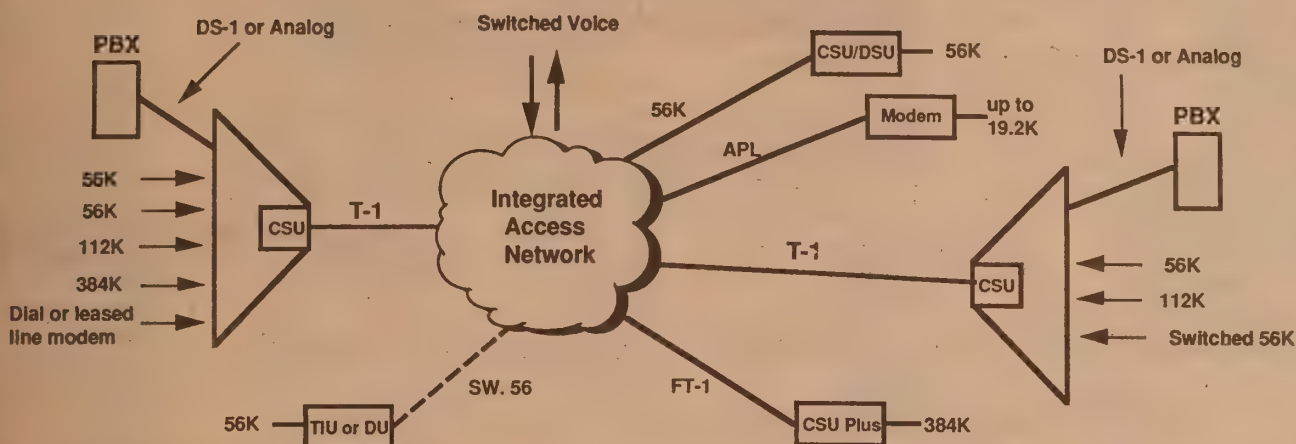
NEW REPORT DETAILS SAVINGS GAINED BY TELECOMMUTING TO MEETINGS

A series of dramatic new developments in Southern California give strong hints as to what lies ahead for telecommuting within governmental agencies. A report submitted after the first year of the Telecommunications For Clean Air Project points out that local governments are going to such drastic measures as closing their offices or reducing their services every other Friday, and in most cases are doing so without any evidence that compressed work weeks will cut costs. Apparently, mid-level civil servants prefer these draconian measures—even though they typically hate to solve problems by realigning work weeks—over trying to accomplish significant cost savings without cutbacks in service through telecommuting. But the evidence is growing that telecommuting saves money—lots of it!

Not yet made public, the Telecommunications For Clean Air report is said to estimate that each year government workers in just Los Angeles, Orange, Riverside, and San Diego counties spend

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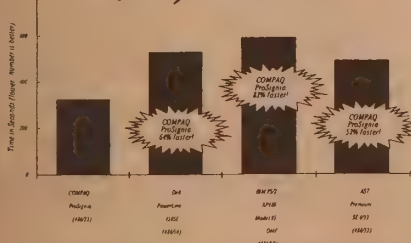
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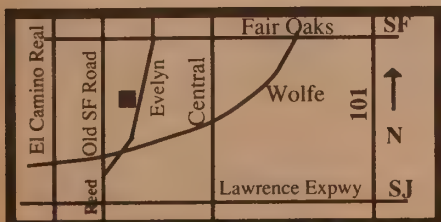


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Sharp 6781/6881/6800	2/4MB 119/199
Sampo NB SX/16, SX/25	2/4MB 145/225
TI Travelmate 2000	1MB 84
TI Travelmate 3000	2MB 69
TI Travelmate 4000	4MB 219
Zenith 320L, 325LB	2/8MB 185/495
Zenith Turboport 386, E	1/4MB 95/299
Zenith Supersport SX	2MB 145
Zenith Mastersport	2MB 99
ZEOS 286, 386	2MB 94

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IBM PS/2 & PS/1 MEMORY

MODEL	IBM P/N
PS/1 286/386SX	2/4MB \$95/149
PS/1 Consultant, Essential/ Expert	1/2MB 45/79
	4/8MB 164/309
386 Valuepoint	2/4/8 89/159/305
486 Valuepoint	4/16MB Kit 159/595
PS/2 30-286	2MB 30F 5360 89
50Z, 55SX, 65SX, 70	2MB 6450604 79
	4MB 34F2933 149
40SX, 35SX, 35LS	2MB 6450604 84
	4MB 87F9977 159
70A21, A61, 121	2MB 6450608 89
80-111, 121, 311	2MB 6450379 109
80-A21, A31, A61	4MB 6451060 210
95, 90, P75, PS/1 Pro	2MB 6450902 110
	4MB 6450128 165
	8MB 6450130 309
16 Bit Exp. Bd. for Model 50, 50Z, 60, 65SX	0K 6450609 144
32 Bit Exp. Board for All 70 & 80 Models	0K 64F30XX 164
RISC 6000	16MB 4010 745
	32MB 4033 1490
	64MB 4036 2890
Other Models	CALL
IBM LAPTOP/NOTEBOOK MEMORY	
CL57SX	2/4/8MB 125/219/375
L40SX	2/4/8MB 95/149/315
N33SX	2/4MB 95/149
N51SX & SLC	2/4/8MB 105/169/309
Thinkpad 700, 700C	2/4/8MB 125/219/365
Thinkpad 300/300C	2/8MB 125/375

COMPAQ MEMORY

MODEL	P/N
LTE 286	2MB 117081-002 \$115
	4MB 117081-003 175
SLT 286	4MB 110237-001 299
LTE 386S/20	1MB 121125-001 59
	4MB 121125-002 195
Contura, Lite 20/25	2MB 129769-001 105
	4MB 129769-002 155
	8MB 129769-003 295
LTE Lite 4/25, 25C	4MB 142337-002 219
	8MB 142337-003 355
Portable 386	1MB 107651-001 109
	4MB 107653-001 299
Portable III	2MB 107332-001 79
EBD	167811-001 199
SLT 386	2MB 118304-001 119
	4MB 118305-001 185
Deskpro 386S (E.Board)	4MB 113634-001 244
	4MB 112534-001 174
Deskpro 386/33L, 486/33L, /50L/25	2MB 115144-001 99
	8MB 116561-001 335
	32MB 116568-001 1275
	6 Socket E. Board CALL
Deskpro 386/20e, 25e (Expansion Board)	4MB 113645-001 244
	4MB 113132-001 174
Deskpro 386/20, 20e, 25, 25e	4MB 113132-001 174
Deskpro 286N, 386N, 386SX/20, 386/25M, 486/33M, 486S/25M, 486S/16M, Systempro, LT486SX/25S, 386 25S	2MB 118689-001 95
	4MB 118690-001 169
	8MB 128877-001 309
Deskpro 486/33L, 486/50L, 386/33L CALL	
Prolinea 3/255 & 3/252S	2MB 141738-001 105
	8MB 141742-001 375
Prolinea 4/33	2MB 141682-001 95
	4MB 141684-001 169
	8MB 141685-001 309
Other Models	CALL

SUN MEMORY

SPARC SLC	4MB \$145
3/60, 80; 4/40, 60, 65	4MB 145
	16MB 495
SPARC 1 & 1+, IPC	4/16MB 140/510
SPARC 10	16MB 625
	64MB CALL
SUN Classic	16MB 655
SPARC Server 630np	4MB CALL
SUN IPX, ELC	4/16MB 155/540
SUN 4/110	16MB 505
SPARC II	16MB 545
Other Models	CALL

AST MEMORY

BRavo 386SX/16	2MB Kit \$79
BRavo 3/33(LC), 3/25S	2/8MB 84/289
BRavo 486/25 & 4/33	2/8MB 89/299
BRavo 486LC	4/8/16MB 145/295/565
Cupid-32 Board	0K
Premium 386C	4MB 159
Premium SE 450	32MB 159
Premium 386/25, SX, 33, 486/25	1MB 39
Premium II 386, 486	1/4MB 37/149
Executive Notebook	4MB (70ns) 139
Other Models	CALL

DELL MEMORY

MODEL	P/N
433P, 333P, 325P, 333D, 325D	
1MB	310-2505 \$44
4MB	310-2507 169
433TE, 425TE & Powerline Workstation	
2MB	310-2466 109
4MB	310-2467 175
8MB	310-2468 319
16MB	310-2469 649
Power Desktop 486D, D/33, D/25, D/20, D/66, 486P/66, P50	
1MB	310-2505 44
4MB	310-2507 169
16MB	310-2625 599
Other	CALL

NEC MEMORY

MODEL	P/N
Prospect 286, 386SX/16	
1MB	PC-21-21 \$99
2MB	PC-21-26 165
4MB	PC-21-22 229
Prospect 386	
2MB	PC-31-21 165
8MB	PC-31-22 419
Prospect SX/20	
1MB	PC-43-21 105
4MB	PC-43-22 229
Powermate 386/25S	
2MB Kit	OP-41-5201 129
8MB Kit	OP-41-5202 359
Powermate 486/25E, 386/33E	
2MB	OP-41-5101 195
Powermate 486/501, 486/33T	
2MB Kit	OP-410-8103 85
8MB Kit	OP-410-2101 345
Powermate Express Series	CALL
Others	CALL

TOSHIBA MEMORY

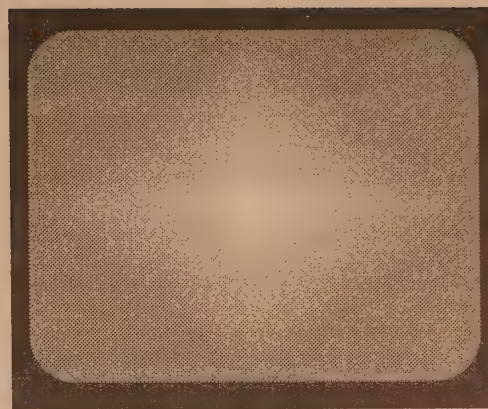
T8500, T5200	2MB 105/335
T5100, T3100E, T1600	2MB 84
T3100SX	2/4MB 105/157
T3200SX, SXC	2/4MB 99/157
T4400SX, SXC, T6400	2/4MB 115/169
	8MB/16MB 315/749
T3300SL	4/6MB 157/249
T1000SE & T1000XE	1/2MB 99/129
T2200SX, SXC, T1000LE	2/4/8MB 105/157/279
T1800/T1850/T2000SX	2/4/8MB 109/159/279

OTHER MEMORY

DEC, HP, NeXT, Silicon Graphics, Zenith:
\$CALL

Deducting Your Home Computer

A Look At Current Federal Tax Laws To Help You Understand Your Tax Benefits When Buying Computer Equipment.



By David A. Simon, CPA and Jennifer Robin Cherniss

RESOURCES:

Internal Revenue Code of 1986, as amended, Section 280F and regulations thereunder
David A. Simon
Certified Public Accountant
Oakland
(510)893-5753

“Can I take a tax deduction for my home computer?”

This question, frequently asked of tax advisors, reflects an area of numerous, fairly recent changes in federal law. There is no simple answer, but it pays to be aware of some of the current flexibilities, loopholes, and requirements. When you buy a computer, peripheral equipment, or software, some basic tax planning will help you maximize your tax benefits.

Computers and peripheral equipment are generally defined by the IRS as “listed property,” a special designation the T-men assign to certain kinds of property whose nature lends itself to personal, nondeductible use, but which the IRS is likely to see claimed as a business expense. Other examples of listed property are automobiles and cellular telephones; software is not included in this definition. Listed property is subject to special, restrictive rules when you seek a tax deduction.

Not all computers are listed property—it all depends on how and where the computer is used, as the reader will see. If your computer is tagged as listed property, the way this affects you depends upon your particular tax situation. In some cases, listed property restrictions may not be so bad. In others, the restrictions will result in the loss of most or all of your tax benefits.

Unless you anticipate and take into account the effect of the listed property rules at the time you make your computer purchase, you might miss important tax opportunities.

WHAT'S AN OFFICE?

According to IRS regulations, computer equipment is not listed property if it is used exclusively at your regular business establishment. If you are engaged in a trade

or business (not as an employee) and the computer is located at your regular business office, it's not listed property. An office in the home can qualify as a regular business establishment for this purpose—providing that office is found to be kosher according to separate IRS strictures.

For your office at home to qualify as such for tax purposes, certain conditions must be met. Specifically, a portion of the home must be used exclusively on a regular basis as: 1) the principal place of business you conduct, or 2) a place of business used by clients or customers when meeting with you in the normal course of business.

For employees, an office in the home must be for the convenience of the employer and required as a condition of employment. The employee's computer, even if used exclusively for the employer's work, is listed property if the home workspace doesn't meet the “office-at-home” requirements. However, if the computer is for the convenience of the employer or a condition of your employment some benefits are available even though it is listed.

Determining if your situation constitutes a home office, however, can be more complicated than that. With all the exceptions and “yeah, buts” that have evolved from

regulations and case law, you may need to do some homework or get professional advice. A recent article in the tax literature analyzing office in the home requirements is *Home Office Deductions Restricted by Supreme Court*, Taxation for Accountants (April 1993). A courtesy copy, reprinted with permission of publishers Warren Gorham & Lamont, is available from my office at (510)893-5753.

TAX BENEFITS AVAILABLE

Ordinarily, a computer used in a regular business will be afforded highly favorable tax treatment. Computer hardware and peripherals are generally eligible for an expense election under which up to \$10,000 of the cost can be deducted in the year the property is placed into service. The remainder of the computer's cost can be rapidly written off over a five-year period, using an accelerated method of depreciation. (Depreciation is the deduction of the cost of an asset over several years.)

As an example of how this works, consider Denny, an independent industrial designer operating out of her home office. Denny just spent \$13,000 on a CAD/CAM workstation. She will elect to deduct the maximum of \$10,000 from the purchase

Generally, the cost of computer software is handled differently than the cost of hardware, because software is treated as a license right rather than tangible property.

Copyright © 1993 by David Simon. All rights reserved. David A. Simon, CPA (M.S., Taxation), is in tax and accounting practice in Oakland and writes on a variety of business issues. His clients include professionals and businesses throughout the state. He can be reached at (510)893-5753.

Jennifer R. Cherniss, a free-lance writer based in Berkeley, specializes in making boring technical information seem less so.

BUSINESS SOLUTIONS

price on her 1993 tax return, reducing not only her income taxes but her self-employment (Social Security) taxes as well. She writes off the remaining \$3,000 according to annual rates from the IRS five-year depreciation table giving her the largest deductions in the first couple tax years. The accompanying illustration shows a simplified excerpt of this table, including sample calculations.

But neither the \$10,000 expense election nor accelerated depreciation is available if

the computer is listed property. Instead, any allowable deductions would be limited to the much slower straight-line depreciation method, where the cost is ratably deducted over five years.

To illustrate the effect of these rules, suppose Alfredo is employed by Dunkum Ringum Brokerage as a securities analyst. Alfredo plans to buy a computer so that he can work at home in the evenings and on weekends. Alfredo intends to use the computer exclusively in connection with

his work, and feels he needs the computer in order to stay competitive in a time-sensitive business. Furthermore, he will dedicate a room in his home to be used as his home office. He initially can't understand when I give him the bad news—not only is the computer listed property, but he can't deduct it at all.

One reason the computer is listed property is because Alfredo does not maintain a qualified office-at-home. His employer maintains a whole suite of desks, computers, phone lines—everything the security analysts need to do their work at the employer's place of business. Even though the employer would benefit by having Alfredo work overtime, it would be just as convenient for Dunkum Ringum if he worked after hours at their facility. And while it may be great for his career to burn the oil all weekend, there is nothing in his job description that requires him to be away from the office.

A similar argument can be made about the computer itself—Alfredo's company supplies the computers needed to do his job. Since Alfredo can't prove that his home computer would be for the convenience of the employer and is required as a condition of employment, he gets no depreciation or any other business deduction.

As if things weren't tricky enough, there's no statutory definition of "convenience of employer." Whether or not the computer is furnished for the convenience of the employer depends on all the facts and circumstances. However, "there must be a clear showing that the employee cannot perform properly the duties of employment without it."

PLAN AHEAD

From a planning perspective, you should ask your employer, or prospective employer, for a written statement saying that you are required to provide your own computer in order to perform your assignments. The employer needn't explicitly require the employee to use the computer. However, while a letter from the boss may be helpful, IRS regulations state that an employer's mere statement asserting that the use of the property is a condition of employment is, in itself, not sufficient.

Other factors the IRS considers are if the computer is needed at isolated or remote job sites, or if your job duties require you to be available on 24-hour call, weekends, etc. If the office is inaccessible at night and you can't be expected to finish all your work without taking it home, that may suggest the computer is used for the convenience of the employer.

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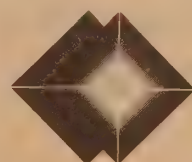
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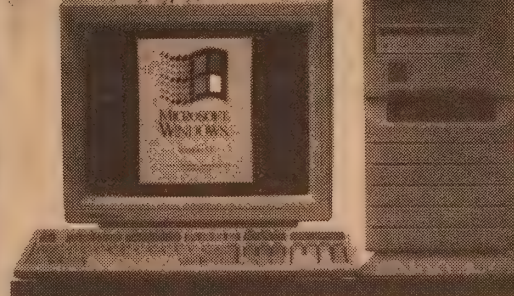
- Univel SVR 4.2 P.E./ Utilities (CD-ROM) \$183/183
- Univel Applications Server..... \$925
- SCO OPEN SERVER (CD-ROM) 16-user.....\$1705
- SCO ODT Personal / Server..... \$975/1139
- SCO TCP/IP RTS 2 user/unlimited/MPX... \$295/475/675
- Sunsoft Interactive Unix SVR3.2.4 Single/Multi.\$325/345
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- NetwareV3.11 (100/250usr).....\$3459/6099
- NetwareV4.00 (5/10/25/50).....\$876/1999/2949/3949
- NetwareV4.00 (100/250).....\$5549/9849
- Multi Protocol Router (IPX,IP,AppleTalk,OSI)....\$875
- LAN Workgroup (5/10/20).....\$1119/1839/2599

Novell Update

- NetWorth hubs integrates Netware multiprotocol router.
- NFS Gateway - (5/10/50user).....\$995/1695/3285
- DataClub use all peer disk space to from virtual network.
- Netware SFT III provide mirrored server fault-tolerant system. Best for business-critical servers ...call for info.
- Netware HosPrint is available now, starting at \$495.00
- Novell Self study kits for CNEs starting at \$25.00

Microsoft/Windows NT

- Microsoft LAN Manager.....\$1495
- provide complete OS/2Server, Netware connectivity, and TCP/IP protocol.
- Microsoft SQL database Server 10 user..... \$2139
- Runs on LAN Manager, Netware, Banyan VINES, and IBM LAN...
- WINDOW NT VLB DEVELOPER SYSTEMS are still on special.....call

High Performance Arena

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All systems are preloaded with one of the following OS:
Windows NT, Lan Manager, and SQL SCO Unix and ODT
Soloaris 2.0 and Interactive Novell 3.11, 4.0 and Univel
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Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
	1 400	2 400	3 401	4 401	5	6
7 500A	8 500A/B	9 500B	10 501	11 501	12	13
14 100, 201 102	15 101 102	16 101 102	17 102 102	18 102	19 260	20
21 103 103	22 103 103	23 105 103	24 103	25 220	26	27
28 400 100	29 400 101	30 401 101				

(For Your Convenience, please call for Catalog of Class Information and Descriptions)

July

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
			1 401 102	2 401 102	3	4
5 Holiday	6 500A 103	7 500B 103	8 501 105	9 501 105	10	11
12 100/201/204 105	13 101/240 105	14 101/241 109	15 102/250 109	16 102/250 109	17	18
19 400/Unix A	20 400/Unix A	21 401/Unix B	22 401/Unix B	23 401	24	25
26 103 100	27 103 101	28 105 101	29 109 101	30 109 101	31	

Day Classes: 8:30 a.m. - Noon, LUNCH, 1:30 p.m. - 5:00 p.m.
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The IRS has issued a revenue ruling which illustrates how to structure an employment contract that avoids having the computer classified as listed property, and which meets various tests for deductibility of home computers. If you have access to a law library, the citation is Rev. Rul. 86-129, 1986-2 CB 48. Otherwise, please feel free to call my office for a copy.

OTHER WAYS TO BENEFIT

Even if a home computer is not used in a trade or business, the cost may otherwise be depreciable if it is used for production of income or investment purposes. Examples include managing an investment portfolio or

Five-year depreciation rates for computer placed in service mid-year

If the Recovery Year is:	Accelerated Depreciation Rate is:	Straight-Line Depreciation Rate is:
1	20.00%	10%
2	32.00	20
3	19.20	20
4	11.52	20
5	11.52	20
6	5.76	10

Example: For a \$13,000 computer (not listed property), \$10,000 is expensed the first year. The balance, \$3,000, is depreciated by an accelerated method as follows:

Year	Amount	Rate	Depreciation Expense
1	\$ 3,000 x	20.00% =	\$600
2	\$ 3,000 x	32.00 =	960
3	\$ 3,000 x	19.20 =	576
4	\$ 3,000 x	11.52 =	346
5	\$ 3,000 x	11.52 =	345
6	\$ 3,000 x	5.76 =	173

TOTAL \$3,000

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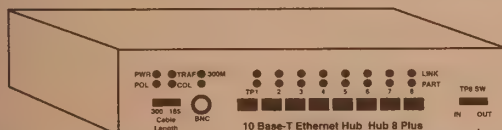


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Ethernet Repeaters

- BNC and AUI connectors for each port.
- Activity and Partition indicators for each port.
- Automatic preamble generation.
- Auto partitioning on Net failure.
- Traffic and collision indicators.

#ETMPR2 2 port repeater ---\$379
#ETMPR4 4 port repeater ---\$549



HUBS

9 Port Concentrator

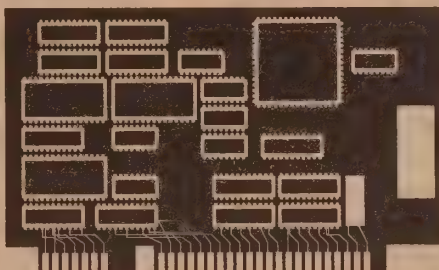
- 8 UTP ports, 1 BNC port.
- Full diagnostic LED's for link integrity, Partition, Activity, Collision, Reverse Polarity, and BNC 300M.
- Supports 185 and 300 Meter Thin Coax.
- Low Cost!

ER6390 Sale Priced @ - \$299

14 Port Concentrator

- 12UTP, 1 BNC, 1 AUI ports (10 Base 2/5T)
- Status LED's for traffic, collision, fifo error, MAU lockup, partition, and twisted pair link.
- Rack mountable.
- Crossover UTP port for linking to other Hubs.

#HUB-II Sale Priced @ - \$595
#ER6391 ---\$495
same as above W/O cross over



PC INTERFACE CARDS

8 Bit 10 Base T

- Novell NE1000 compatible
- Multi Packet Buffer
- Very low cost

#1000T on Sale @ -----\$55

8 Bit Coax

- Novell NE1000 compatible
- BNC and AUI connectors
- 8K Multi Packet Buffer

#1000C on Sale @ -----\$55

16 Bit 10Base T

- NOVELL LAB CERTIFIED
- Novell NE2000 Compatible
- Status LED's and lots more

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Lifetime Warranty

16 Bit Coax

- Netware, PC/tcp, PC-NFS, NCSA, NDIS Compatible

- NOVELL LAB CERTIFIED
- BNC and Coax connectors

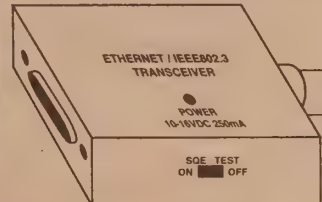
#2000C on Sale @ -----\$59
Lifetime Warranty

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- BNC, VTP, AVI
- 50MHz SPEED LOCAL BUS IT SCREAMS!
- INTEL 82586 CA Controller
- Netware ODI, SCO, UNIX & NDIS drivers

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- Complete AUI to UTP Link
- Selectable Link and SQE tests
- 6 Status LED's

#2010-TP Sale Priced @ ---\$49

10 Base 2 Coax MAU

- Complete AUI to Thin Ethernet transceiver
- Selectable SQE test

•up to 600M without a repeater
#2010-BNC Sale Priced @ ---\$49

FOIRL MAU

- Its loaded call for details

#ET-300F ---\$395



POCKET ETHERNET ADAPTERS

10 Base 2

- Compatible with Net Ware, LANtastic, TCP/IP, and PC-NFS
- Diagnostic Leds for Power/Xmit and Host activity

#PE300B ---\$179

10 Base T

- Compatible with Net Ware, LANtastic, TCP/IP, and PC-NFS
- Diagnostic Leds for Power/Xmit and link/rev, collision, and Jabber

#PE300T ---\$179

Miscellaneous Items

10 BASE 2 Cables		Qty 1	Qty 10	Qty 50	Qty 100	Qty 1000
R5810	Patch Cable RG58U 10'	\$4.80	\$4.40	\$3.90	\$3.75	\$3.60
R5825	Patch Cable RG58U 25'	\$10.00	\$9.25	\$8.50	\$7.50	\$6.20
R5850	Patch Cable RG58U 50'	\$18.00	\$17.25	\$16.50	\$15.50	\$14.50
BC58	Patch Cable RG58U 1000'/roll	\$68.00	\$66.00	\$65.00	\$63.00	\$62.00
Connectors & Splices						
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TFFM	BNC Adapter T type M/F/F	\$3.00	\$2.40	\$2.20	\$1.60	\$1.20
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Term50	50 Ohm Terminator 1%	\$3.00	\$2.90	\$2.50	\$2.40	\$2.10

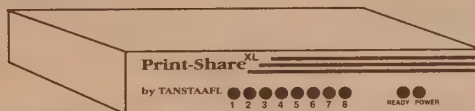
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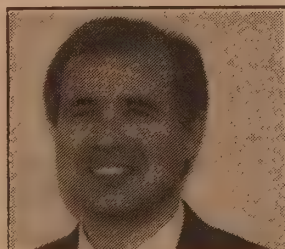
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figuring your taxes. The listed property rules will apply, however, so the only way to recover your costs is by claiming straight-line depreciation. Report this as a miscellaneous itemized deduction on Form 1040 Schedule A.

What if you use your computer for more than one use; e.g., partly for qualified business use, partly for investment tracking, and partly for personal purposes? Unless your qualified business use is more than 50%, the listed property rules will apply to both the business use and the investment use. If you meet the 50% test, you need to allocate the cost of the computer among the separate uses. Regulations provide that this allocation is

the less favorable straight-line method.

HOW TO GET YOUR DEDUCTIONS

The cost of the computer is reported on Form 4562, Depreciation and Amortization. If the computer is listed property it is separately reported on Form 4562 in Part V.

As an employee, once you determine that you can depreciate or expense the cost of your computer, you will report the deduction from Form 4562 on Form 1040 Schedule A, as a miscellaneous itemized deduction. These deductions are allowed only to the extent that the total of all miscellaneous itemized deductions

license right rather than tangible property. The cost of software is amortized ratably over five years or the useful life of the software, whichever is less. For example, any of the major word processing packages can be expected to be useful for five years, albeit supplemented by annual upgrades, and can therefore be amortized over five years. (Amortization can be thought of like depreciation, but for intangibles.)

Because software is not tangible, it does not qualify for that up-to-\$10,000 expense election in the first year of service. However, under an exception to the general rule, if software costs are included in the cost of the computer hardware without being separately stated, the software costs

The IRS has issued a revenue ruling which illustrates how to structure an employment contract that avoids having the computer classified as listed property, and which meets various tests for deductibility of home computers.

determined on the basis of the number of hours the computer is used for each purpose. In no event can you take deductions for that portion allocated to purely personal use, even if you are a therapist having a session with Leisure Suit Larry.

For example, Ellen uses a home computer 60% of the time to manage her investments. She uses the computer 30% of the time in her part-time consumer research business, and 10% of the time for purely personal matters. Because her business use percentage does not exceed 50%—even if 90% of the use is for income generating purposes—the listed property rules will apply to all the business/investment use. She cannot elect to currently expense any of the costs; instead, 90% of the costs will be depreciable over five years, only by using

exceeds 2% of your adjusted gross income for the year.

The 2% floor will apply every year that you are claiming depreciation. But if the computer is *not* listed property, you can usually elect to expense the entire cost, up to \$10,000, making the 2% floor apply only once. This creates a strong incentive to meet the office-at-home tests, so that the home computer will not be listed property.

For some of my clients, the 2% floor is of little consequence, because their aggregate miscellaneous itemized deduction almost always exceeds the floor anyway. But frequently little or no tax benefit remains after the 2% floor is applied.

HOW TO HANDLE SOFTWARE

Generally, the cost of computer software is handled differently than the cost of hardware, because software is treated as a

are treated as a part of the cost of the hardware. This would be the case where the bill for the computer system does not itemize or separately state the cost of the software and hardware.

This provides some tax planning opportunities when the salesperson goes to write up the ticket. To accelerate your deductions, software and hardware costs should be billed separately if the software has a short (less than five years) useful life. However, if the computer is not listed property, you may be able to take greater advantage of the \$10,000 expense election by including the software costs as part of the hardware. Also, while accelerated depreciation is available for computer hardware which is not listed property, it is available for software only if the software is invoiced as part of the hardware. ■

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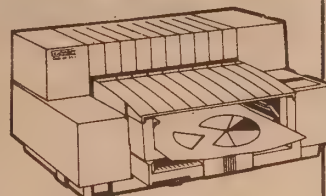
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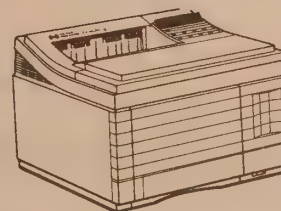
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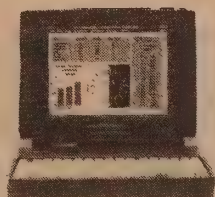


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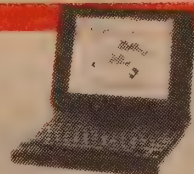
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- 101 Key Enhanced Keyboard

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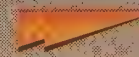


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- 14" SVGA Non-interlaced monitor 0.28 dpi
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- 2 button Hi-Re serial Mouse

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- IDE 2H/2F Controller
- 2 Serial 1 Parallel 1 Game Port
- 101-key enhanced keyboard, MITSUMI
- Mini-tower case w/ 200W power supply
- 14" SVGA Non-interlaced monitor .28 dpi
- VL-B Graphic Accelerator w/1MB (Expandable to 2MB) Max 1280x1024 16.7 Million Colors. Driver Support Windows 3.1 AutoCAD R.12 OS/2 V.2.0
- 2 button Hi-Re serial Mouse

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- Mini-tower case w/ 200W power supply
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- VL-B Graphic Accelerator w/1MB (Expandable to 2MB) Max 1280x1024 16.7 Million Colors. Driver Support Windows 3.1 AutoCAD R.12 OS/2 V.2.0
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- Windows Accelerator Card w/ 1MB
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 - Mini-Tower case w/ 200W Power supply
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 - 2 Speakers & Microphone
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Pentium (And Alternative) Servers

Powerful Systems Waiting In The Wings

BY YACCO

Last month I began a discussion of the technology you're likely to find inside your next server. Pentium looms large, but it seems that there is at least some chance that the applications dominating corporate America will run on something other than an Intel-based architecture. In fact, as the Microsoft Windows paradigm achieves an increasingly tight grip on business applications, it seems more and more likely that other vendors will seek to run them on their own chips.

PENTIUM ALTERNATIVES

Where will the alternatives come from?

Motorola's 68060 will be out less than a year after Pentium. Volume manufacturing is expected by this time next year. The first chips are expected to ship at 50 MHz., and they could go to 80 MHz. (Initial Pentiums will ship in 60 and 66 MHz. versions.) The design could even go to 120 MHz. over the first five to six years while it's in its prime. The 68060's pure 32-bit design has obvious implications for overall system costs. (A 64-bit design speeds up traffic between the chip and the outside world. Lamentably, it also requires a motherboard designed with the wider pathways.)

However, you probably won't see the 68060 used as an alternative to an Intel chip. It's principally intended as a replacement for the 68040. The decision to stay with 32 bit architecture let Motorola make a chip that's essentially plug compatible. Jim Reinhart, marketing/applications manager for the 68000 series, says it was a key design goal, and helps to insure that the cost difference between '040 and '060 systems will be "a very small premium." The design investment for 68060 systems based on '040 designs should be only about 10% of the original. It will be possible for vendors to

bring out much more powerful systems with only marginal price increases—even if Apple does charge for it like a totally new design.

However, there are other chips that could vie for Intel's market share. Darwin Chang, director of engineering for Elitegroup in Fremont, says the Power PC from Motorola and IBM is the most significant competitor among the Intel-incompatible technology. The Power PC is a 0.65-micron design which will initially be available in 50 and 66 MHz. versions. While its design differs more from the Pentium than does the 68060, it is a superscalar chip with the ability to process multiple instructions per clock

cycle. It's being developed for the next-generation Macintosh replacement and future IBM workstations, but Microporcessor Report's Michael Slater also allows that it could see service running NT. At least it's a more likely candidate than the 68060, Sun's SPARC, Digital's Alpha, or Hewlett-Packard's PA-RISC.

As to when that might happen, though, no one's making any promises. For now, "Intel-compatible processors have a chokehold on the market," says Chang.

PENTIUM AVAILABILITY

If you do decide on a Pentium-based server, you should be able to buy one fairly soon. Intel has built three new foundries for the chip that reflect a substantial part of the \$2.5 billion it has spent for R&D and productive capacity. Expansion for Pentium came on line last fall in New Mexico.

Evaluation quantities of perhaps ten thousand units will ship during the second quarter, and yields will ramp up within nine to twelve months. Production in the hundreds of thousands is expected around year-end. Santa Clara and Ireland foundries will both be pumping out Pentiums by then. "We plan to cross the one million bar in '94," says Pentium product marketing manager Yair Sakov. Another New Mexico plant will come online by the beginning of '95 for both Pentium and future processor generations.

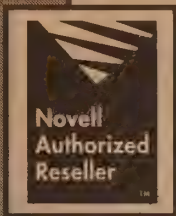
Supporting chip sets are also required before anyone can build a Pentium-based machine. They are already available from OPTi, and Intel's should ship with the first Pentiums. OPTi's set supports 32-bit wide VESA VL-BUS local bus. Intel will support Peripheral Component Interconnect (PCI). PCI systems are capable of a maximum 132 MHz. burst rate and have a 120 MHz. maxi-

*Darwin Chang, director
of engineering for
Elitegroup in Fremont,
says the Power PC from
Motorola and IBM is the
most significant competi-
tor among the Intel-
incompatible technology.
For now, however, "Intel-
compatible processors
have a chokehold on the
market," he says.*

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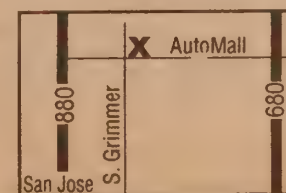
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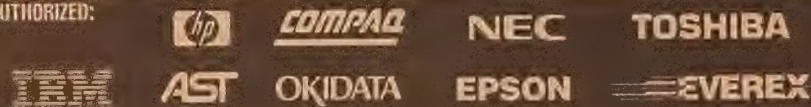
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mum usable bandwidth. They are similar to the VESA local bus, with which they compete, in that PCI provides a fast bus for video or other peripherals. However, on a '486, VESA local bus is directly connected to the CPU. On a Pentium system, both the OPTi VESA and Intel PCI systems connect to the CPU as a "bridge" or mezzanine bus that sits between the CPU bus and an ISA, EISA, or MicroChannel peripheral bus.

Motherboards are waiting to be stuffed with the chips too. Elitegroup Computer Systems in Fremont, for instance, already has two basic design families for the Pentium. One family consists of low-cost ISA and VESA systems; the other solution is a 32-bit PCI design that will debut as early as Spring COMDEX. Unfortunately, that doesn't mean you'll be able to pick up an Elitegroup Pentium server by then. Although Elitegroup's systems will appear at COMDEX, you won't be able to buy them immediately, because Elitegroup sells only to OEM customers.

However, it shouldn't take long before they filter down the pipe. The company sells to many top-tier manufacturers including four or five of the top twenty or so vendors. In fact, Chang claims that it's the world's largest non-captive manufacturer of motherboards. (Elitegroup is contractually prevented from disclosing its relationships, but there's a fairly reliable way to tell if you're using one of its motherboards. For the boards to be interchangeable among the company's customers, they have no logo or name on them. So, if there's a motherboard in your computer without any identification on it whatsoever, chances are high it was manufactured by Elitegroup.)

Finally, there's the question of what a server based on this new technology is going to cost. Chang suggests that non-PCI machines based on ISA or VESA will probably just replace the CPU, and their prices are likely to differ only by the price difference of the chip. PCI boards will have larger and faster caches, wider bandwidth (64-bit) and faster components that eliminate bottlenecks. They should cost anywhere from \$4K to \$8K for a single-processor version.

Multiprocessor versions, though, will up the ante considerably once operating systems have been ported to them. There are those extra processors for which to pay, and you've still got to incorporate the disk arrays and other resources that will serve all your multiprocessed workstations. Still, while your Pentium-based system won't be cheap, it will still deliver substantial savings over a mini, and good performance to your users. ■

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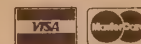
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A New Kind Of

Computer Virus

*And A Few Words About
Client-Server Computing*

BY BENNETT
FALK

With symptoms not unlike St. Vitus' Dance, Internet Madness is in full bloom. Everyone, it seems, wants to take a tour of Cyberspace, do some Net Surfing, ride the Gopher, goof around with Archie and Veronica, and come home with an apparently inexhaustible store of trivia and GIF files of satellite weather photos for every stop along the way. The Winnebago of the 1990s is a Sun workstation with a "Stumps of Mystery" bumpersticker.

This kind of public fascination raises the possibility that the most devastating computer viruses are in the minds of the users. It may well be that our computers only work because we have the right expectations about what they can and will do. It may be that we break our computers

when we forget what they're for. In any event, we are about to see what happens

when millions of people with wildly diverse expectations attempt to use a computer network.

UNIX

INTERNET MANIA

The object of all this attention is the Internet: a network of computer networks communicating with each other through the use of a common network protocol (the Internet Protocol, IP, also referred to as TCP/IP when paired with the Transmission Control Protocol). This worldwide "meta-network" grew out of research imperatives of the defense industry in the United States roughly a quarter century ago. The Internet has steadily evolved away from the defense industry toward the academic mainstream and toward public acceptance.

The Internet was propelled to celebrity status in November, 1988 following a famous incident involving a "worm" program that went awry, rendering the network and many of the machines on it unusable. The Internet Worm brought the Internet to the attention of a very large, general audience.

This ought to have been bad publicity. The worm incident was a strikingly clear example of the difficulty of ensuring network and system security. That something, done apparently without malicious intent, could have such devastating effects indicates how fragile (and potentially unreliable) networked resources can be. Since 1988, however, interest in and use of the Internet have grown exponentially, and in the last few years, the Internet has become a kind of cultural icon, an end in itself, something much grander than an instrument for academic research.

Inevitably, many of the new users attracted to the Internet will be disappointed. Their disappointment will not stem from any shortage of sources of information on the network, nor will it be caused by reliability problems or interruptions of service (which are quite rare).

The real disappointment will arise from the discovery that the network is, after all, not something people use. The actual users of the network are machines and pieces of software. This is a good thing. No one in his or her right mind wants to handcraft Internet Packets, launch them into the great beyond, and decipher whatever comes back. Disappointment sets in because the machines and programs that actually use the network don't make any great show of doing so.

In spite of the many extant colorful descriptions of network activity, the interfaces through which people interact with the network are decidedly unsexy. In a world of fancy display hardware and Graphical User Interfaces, the services available through the Internet still operate largely on the principle that a user interface ought to be device independent.

Navigating through a hierarchy of ascii menus to locate a file about the history of data transmission through telephone lines is pretty boring, even if each menu in the hierarchy comes from a different computer

in a different corner of the world.

CLIENT-SERVER AND YOU

The thing that makes it possible for us to do such exciting things in such boring ways is the architecture of the applications that use the network. Indeed, we can talk about a network application as something different from the programs that are designed to run on standalone computers. Even if you don't give two hoots about Internet, Local Area Networks have become so pervasive that understanding a thing or two about network applications is rapidly becoming a matter of self-defense.

Conventional programs are either entirely self-contained or can get the resources they need locally, usually from one or more files residing in a file system on the computer from which the standalone program is run. In an environment where a lot of people need to use the same program and the same data, conventional architecture requires either that the data be replicated on many machines, or that everyone runs the program on the one machine where the data resides. Forcing everyone to run on one computer traditionally creates performance problems; replicating the data everywhere wastes disk space and traditionally results in data integrity problems when the various copies need to be reconciled.

The distinguishing feature of network applications is client/server (or requestor/server) architecture, and it addresses these problems. Virtually all the applications that are used to reach resources on the Internet use the client/server model. Many commercial applications, particularly database systems, also use this design.

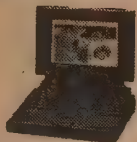
The basic outlines of the client/server architecture are fairly simple. A user, needing information or access to some resource, starts up a program (a client) that collects from the user details about what is needed. When the request has been entered to the user's satisfaction, it is dispatched to

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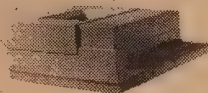
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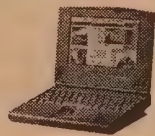
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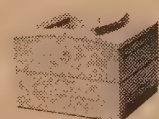
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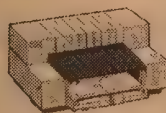
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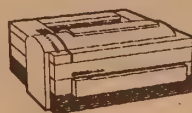
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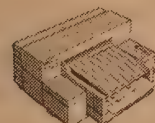
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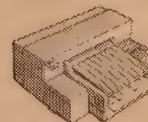
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BUSINESS SOLUTIONS

another program (a server) that controls the information requested. Note that here the word "server" refers to a program. In other contexts it is not unusual to describe a computer as a server when it provides some resource (disks or filesystems, printers, etc.) for other machines on a network. Server programs can be designed to manage almost any kind of resource. We usually think first of database servers, but there are servers of other resources as well.

The server receives the client's request, evaluates it, finds the desired resource or information, and returns it to the client. The dialog between the client and the server takes place in a limited purpose language, a protocol, that is specific to the needs of the application.

When the server returns the requested information, the client provides an interface through which the user can either view the information or direct it elsewhere. When the user is through with results and has no further requests, the client program exits.

It could be said that a client program is always run ad hoc. The user starts the client to articulate a specific request or requests and stops the client when the needed information or resources have been provided. The server program, on the other

hand, is intended to run continuously. When there are no active clients, the server continues to run, monitoring whatever channels have been set up for clients to submit requests.

Client/server architecture ought to look familiar. It is essentially an extension of the structures that provide services like the spooling of jobs to a printer. On UNIX systems, processes (like print spoolers) that run continuously in the background were originally referred to as "daemons." As UNIX became more popular, the language gravitated to more familiar forms, and gradually "demon" became the accepted term for these prototypical servers. In general, the UNIX demons are not network applications and they are not intended for interactive use. The demons provide services on one host only, and the services they provide are very specialized. In contrast, client/server interactions can be arbitrarily complex and can be distributed across an entire network.

Client/server architecture is extraordinarily versatile. Clients can be built to maintain multiple simultaneous connections to a server or to connect to more than one server at a time. Adequately programmed, servers can open

Everyone, it seems, wants to take a tour of Cyberspace, do some Net Surfing, ride the Gopher, goof around with Archie and Veronica, and come home with an apparently inexhaustible store of trivia and GIF files of satellite weather photos for every stop along the way.

connections to other servers. Clients and servers can be built to support multiple network protocols. And client/server dialogs can occur between computers of wildly different architectures.

Servers tend to be "multi-threaded": they can serve multiple clients at the same time. There would not be much advantage to client/server architecture if one client



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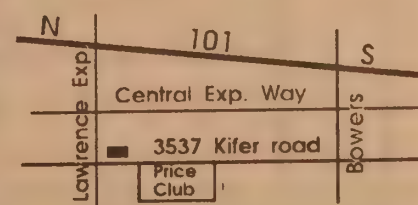
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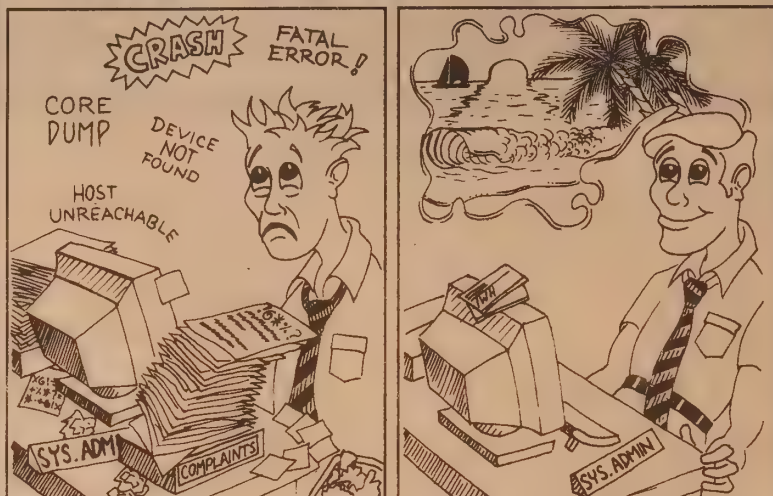
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accessing the server blocked out all others. A server capable of supporting multiple users simultaneously reduces the need for each user to have a private copy of the resource the server controls.

Given a sufficiently robust network, client and server programs need not be run on the same computer. Running the client and server on separate hosts avoids one of the problems of conventional software architecture by distributing the

processing to be done across more than one computer.

For a server to be publicly accessible on a network, the network must allow the server to designate and publish a network address on which it will listen for connections. Exactly how this public address is handled will depend on the network and the protocol it uses.

Networks based, like the Internet, on the TCP/IP Protocol allow programs using network resources to bind a connection point (technically called a "socket") to a "port" number that other applications can use. Port numbers are always relative to a specific computer; to connect to a server over the network, it is necessary to know the name of the computer the server is running on and the port number the server monitors for new connections. Clients across the network may attempt to connect to the server through this published address.

Of course, a multi-threaded server receiving messages from all around the network would not be of much use if the first client to make a connection tied up the port that the server monitors needed for new connections. In general servers are constructed to accept new client connections on the published address and immediately transfer them to a private address that will be used exclusively for this particular client/server dialog. This frees up the publicized address to accept new connection attempts and keeps client/server dialogs from interfering with each other.

LAYERS UPON LAYERS

Now, finally, something can be said about how clients and servers use networks. Oddly enough, they don't. What they actually use is another layer of protocols: in addition to the "application" protocol that the client and server use to structure their dialog, both programs must also now have an interface to the programs that manage the lower levels of network traffic on their respect hosts.

The actual path between client and server is a little more complicated than first sketched. The client accepts a request from the user, encodes it in the proper application protocol for the server's benefit. This package and enough information to route it properly are handed



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BUSINESS SOLUTIONS

off to the software that manages the network traffic for the host machine on which the client is running.

The network manager knows nothing about either the application protocol or the content of the message to be sent. Its job is to wrap the package it receives in at least one more protocol for the benefit of the network manager on the receiving

end. It may also divide the message into multiple packets to be transferred over the network.

The end result is then pushed out on to the network, where the protocol added by the network manager functions like the address information on a letter or package given to the postal service.

The network manager at the receiving

end unpacks the outer protocol from each packet as received. It resolves any questions about the accuracy of the transmission, requesting retransmission of anything that is missing or garbled. The assembled package is handed to the server where the application protocol is decoded and the request acted upon.

With nested protocols stacked up on either side of the actual transmission of data, skeptics will say that the whole procedure suggests a corollary to Zeno's paradox: the movement of data over a network is an illusion because another layer of protocol is always needed.

In fact this layering of protocols and software is what makes the network manageable. Each layer has a clear functional role and clearly defined procedures for interfacing with the layers above and below it.

The client program uses its interface to a network manager to interact with the server. The client need not be conversant with any of the details of the network's operation (and there are many) between the two network managers.

As long as the procedures for one layer's interfaces to its neighbors are left intact, the layers can be very tolerant of change. The protocols used between the network managers and even the physical network could change without requiring any changes in either the client or the server. Similarly, the client program and the application protocol shared by client and server could change dramatically without disturbing either the network manager or the protocols that provide the client/server connection.

The outermost layer of all this, furthest removed from the network and most protected from the details of what is being done, is the human layer. Here the orderliness of the layered architecture of client, server, and network breaks down. The human user brings a wealth of vision and experience that even clever applications and servers cannot anticipate. The humans involved will almost certainly be compulsive speculators about what goes on every step of the way into and out of the network. They will have expectations and in ways we don't yet understand, these expectations will either make the machines work or break them. The best we can do is expect the right things and not forget that the tools we use are also human artifacts. ■



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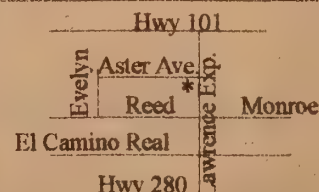
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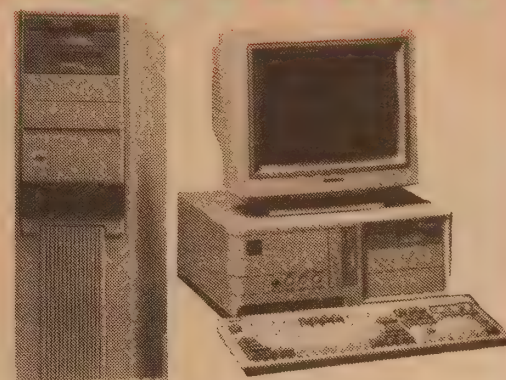
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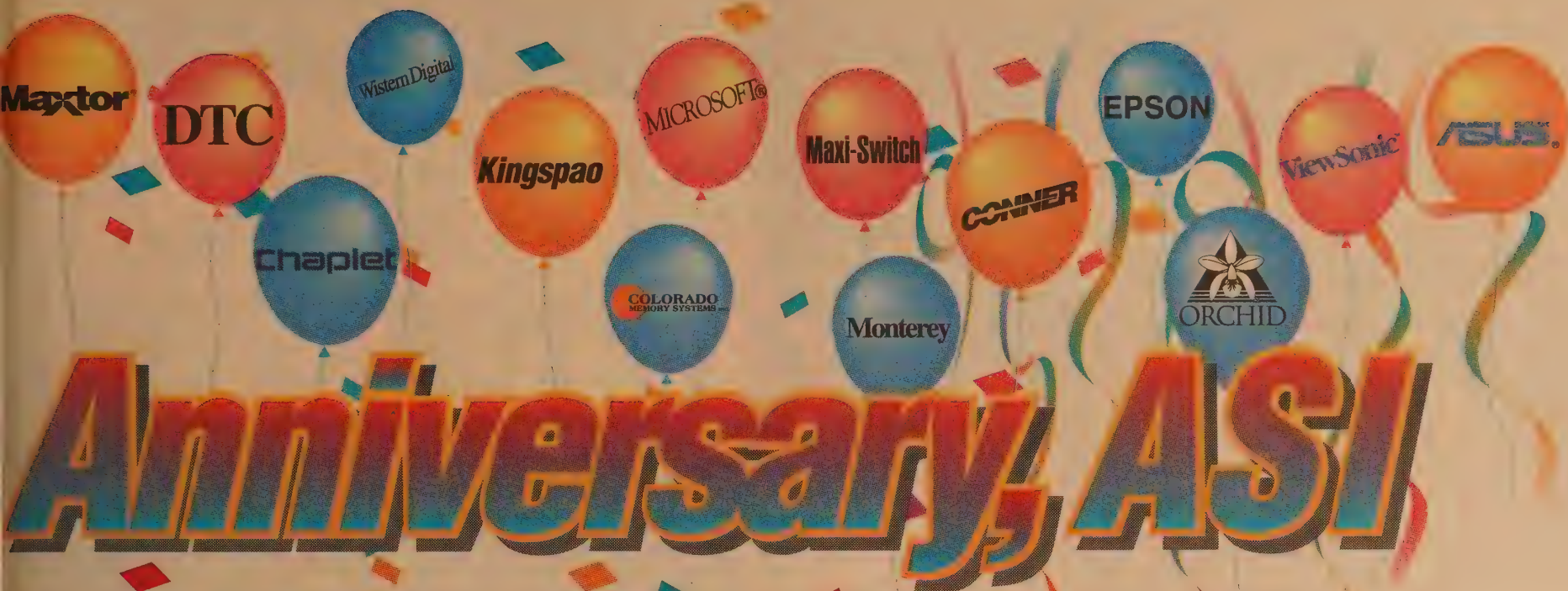
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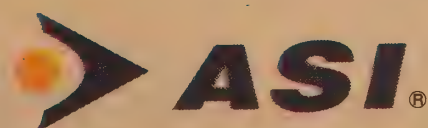
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REVOLUTION & OPPORTUNITY

AS WE GO TO PRESS WITH THIS STORY, ESTHER DYSON IS IN LJUBLJANA, SLOVENIA, working on the arrangements for this year's East/West High Tech Forum, which will once again bring together entrepreneurs and programmers from the erstwhile Eastern Bloc and their more established counterparts in the West. This, some would have it, is an exercise in quixotic futility, but Dyson has never been one to follow the conventional wisdom, though she's frequently had a hand in shaping it.

"Esther," says longtime friend Mitch Kapor, who invited her to serve on the Electronic Frontier Foundation's board of directors, "is always interested in

By Mary Eisenhart

An Interview W

the new, the offbeat, the leading edge, just because it's interesting. So from very early on, she's done the best industry analyst coverage of emerging technologies, from groupware to AI to you name it. That's her specialty. And finding those people who are going to be the key movers and shakers. The PC industry renews itself, and sort of cross-pollinates with itself, when we bring together all the people at one of her conferences.

"Esther is not a promoter. She doesn't, as I see it, ride these hobbyhorses and say this thing is going to be great, it's going to change the universe. She asks more questions, sometimes, than she has answers.

"I don't look to Esther to provide lucid technology evaluations. She spots the right people. Then I go talk to them myself. She points in the right direction. She identifies the circumference where interesting things are happening."

Often called "the most powerful woman in the computer industry," Esther Dyson is the proprietor of EDventure Holdings Inc. (212/758-3434), a small New York-based company that produces two newsletters, *Release 1.0*, aimed at the US computer industry, and *Rel-EAST*, which covers emerging technology markets in the former Soviet bloc, as well as two annual conferences, PC Forum and the East/West High Tech Forum. In addition to serving on EFF's board, she's a limited partner in Mayfield Software Partners, an affiliate of the Mayfield Fund, a leading venture capital firm, and a trustee of the Santa Fe Institute, a New Mexico thinktank devoted to complex systems, what some would call Fringe Science. But she eludes definition in these terms as readily as she eludes definition as the daughter of noted physicist Freeman Dyson.

"Esther," says EFF co-founder John Barlow, "is very much a creature of the present. She's just fast-moving. She's very *light*."

At PC Forum, she tells the departing attendees, "The purpose of the conference is to change minds. If you don't walk out of here with any new ideas, we haven't done our job." And, while the pricey and star-studded Forum bears some resemblance to other industry gatherings, there's a deliberate deviation from the boilerplate.

There's not a suit in sight, and the casual observer would have a hard time telling the industry honchos from the hopeful garage guys. Nor would it particularly occur to the unsuspecting visitor that the short-haired, barefoot figure hanging out in the halls talking to people is in charge. On panels, any executive unwary enough to sound like his marketing department gets "That's very nice, but what does it *mean*?" from Dyson.

This year's conference sessions ranged from the pragmatic to the visionary; instead of yet another lecture on Windows NT's path to world domination, the assembled executives, VCs, entrepreneurs, analysts and marketroids got Congressman Edward Markey holding forth on "A Vision For The Electronic Frontier," and, in an almost riotously well-received lunchtime address, Santa Fe Institute's biologist Tom Ray's discussion of genetic algorithms and his artificial-life "critters."

"These are people," says Barlow, "who are not going to run across that stuff anywhere else. And they may not know very much about bit-flipping—I think

that Tom was probably making some false assumptions about the technical expertise of that audience—but when somebody starts talking about growing your own software for complex environments, I would say that every ear in that room was listening."

Not, of course, that every presentation is so successful. Barlow recalls, "I remember a speech here a couple of years ago from a guy that really had some very important ideas, but didn't have a good way of presenting them, and it was *appalling*. There were actually people throwing dinner rolls at him. It was so bad it was terrific.

"That was a risk she took that didn't quite make it, but she takes those risks, and I think they are a valuable service in enriching the overall ecology of the business."

Says Daphne Kis, director of the Forum and one of EDventure's small intrepid staff, "It's Esther's whole goal to not espouse the party line, but to get people to say something to push the edges, to redefine the boundaries in some way.

"There's no definitive agenda because it all fits together, because it's all motivated by what she's interested in. She's not beholden to anyone other than her interests. It's a very unique position. If there's something she decides she's interested in, she makes herself an expert in a very short period of time."

"She found out that I was going down to the CIA the other day," says Barlow, "and immediately wanted on that bus just to see what the inside of the CIA looked like. She didn't have some direct functional reason for doing that; she went a ways out of her way to do it. But she saw the opportunity and jumped on it."

And so, when we met for this interview at the Computers, Freedom & Privacy conference, we started with the obvious question...

What was the CIA like?

Well, I found it depressing. My reaction to it was simply that yes, these were people that wanted to change, but they didn't get it. Just like IBM. Just like Gorbachev. There's this sort of intellectual understanding that we ought to change, but there's none of that thing, somewhere between emotional and intellectual, where you get it. They don't really. Some of them surely do, but to me a good intelligence service is smarter than everybody around. They don't just have more information, they're better at analyzing it.

It's like the feeling I had when I was in college and I decided I needed to go see a shrink.

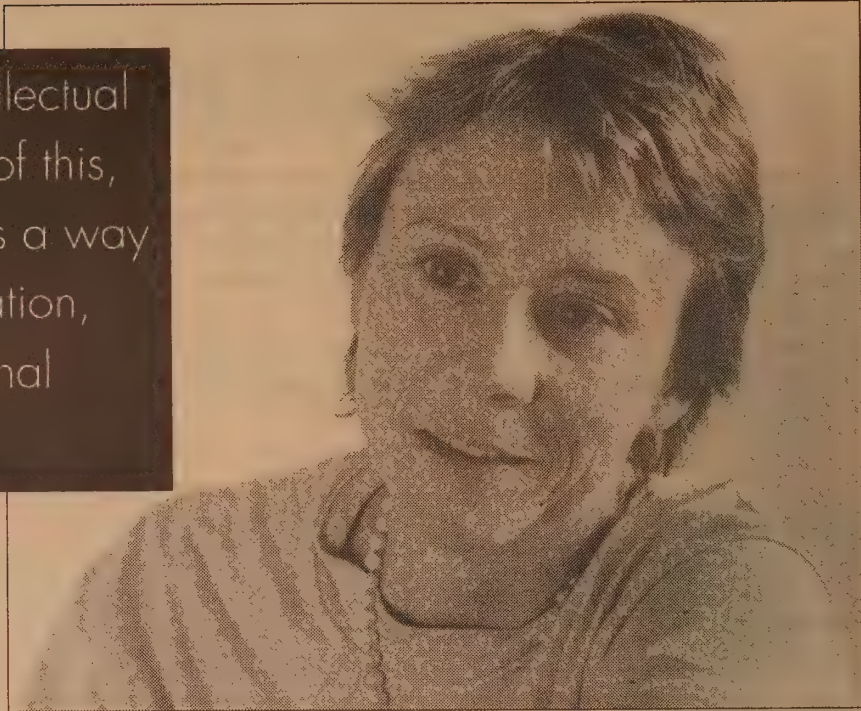
I went, and he didn't ask me tough enough questions, so I just lied to him. Not because I really wanted to lie, but because he wasn't smart enough to get to the point. So that was it. I said, forget it. Whatever problems I've got, I know more than this guy does.

I had the same frustrating feeling about the CIA.

In Russia, I go out and I talk to *folks*. You get the sense that IBM, the US government, the CIA, they all talk to senior political officials. The senior political officials in Russia were completely out of touch with reality too. The guys who ran the coup were drunk out of their minds the whole time. They had no idea what popular opinion was, they didn't have the sense to turn off Relcom [a net

ith Esther Dyson

"I'm much more right-wing on things like intellectual property, and letting markets manage more of this, and laws and regulations less. I think there is a way to have a market in a lot of personal information, as long as you give ownership of that personal information to the individuals."



node that disseminated regular bulletins to the outside world]...

I'm glad we're doing it, and I was very interested to go meet some people from the CIA, but I'm not as optimistic as the others.

On the other hand, if the CIA wants to come out and be on the nets, God bless 'em, and we'll help them if we can. Except that's not EFF's primary mission. To my mind our mission is to help foster the creation of communities. Not just the existing net community, but other communities that might come onto the net, even if they never become part of the "net" community.

In the end, a community should be focused around something, not around its own existence. It needs some identity that's bigger than itself. Not larger, but more than just being its own collection. It needs some distinction between itself and the rest of the world, whatever that might be. Just like a living thing.

Yeah, and it contains in itself that it is this, and it is also not that.
Right.

You can't separate the not-that. People go through great religious problems about that.

Yeah, each community has an immune system, therefore. That's fine, as long as you defend your community rather than attack other communities.

How did you come to get involved with EFF at all?

Well, I've known Mitch for a long time. He's one of the people that has good values, and he started getting interested in this kind of thing.

I thought what EFF was doing was neat, and I talked to him a bit, but I'm still very much out in the commercial world. So when he asked me to join the board, the first thing I said was, "Well, you know, I don't really agree with you on everything." And he said, "Well, that's just the point."

At which point I said, "Well, great, wonderful..."

What didn't you agree with him on?

Actually, less than I thought. But my job is not to be part of the net community. With EFF, it's to allow it to exist and help define rules for it.

I'm much more right-wing on things like intellectual property, and letting markets manage more of this, and laws and regulations less. I think there is a way to have a market in a lot of personal information, as long as you give ownership of that personal information to the individuals.

But I don't spend all my time on the network. I see myself more as an ambassador from this community to the commercial world that needs to know about it. I'm more of an observer, so I'm not really a member of it.

I'm not really a member of the commercial community, but it's probably more my community than this one.

What community do you consider yourself a member of?

Really, none, in any serious way.

Same thing in Russia—I don't go around pretending to be Russian.

But you speak Russian.

I speak Russian and I understand it better than most people, but I'm not in it. I'm much more of a catalyst everywhere.

The other reason I joined EFF was I knew I wanted to learn more about this stuff, and I wanted to get more involved and more informed, because I didn't

really know what my opinions were, or what EFF's opinions were, or anything. Clearly the best way to do that is to jump right in and force yourself to learn.

I expected to learn a lot about the Internet and all the stuff. The other unexpected pleasure is that what I *am* part of is the board of EFF. The first time you go to any of these meetings you feel like an outsider, but now I feel part of this group. Not a homogeneous group, but...

That's been fun, because in what I do, I mostly observe. I argue with people, but I don't get in there and help make decisions. I'm not *engaged*. So that's been really nice.

So how did you get into this line of work, varied as it is?

Well, I originally was a reporter for *Forbes* for three years. I had no knowledge of business. I started as a checker, where somebody would write a story and I'd go check their facts.

This was right out of college?

Well, I did two years of the moral equivalent of dishwashing. I worked for a public interest group for a year, and realized I didn't think what these people were doing was in the public interest. My first real publication was "Help Wanted: Employment of Women and Minorities in Retailing." Which I thought was a great title.

We took Sears, Montgomery Ward's, K Mart, which at the time was Kresge, W.T. Grant, which has since gone bankrupt, and J.C. Penney. We got their EOC filings, and we analyzed those with a little calculator, and I talked to the companies about their policies and practices.

W.T. Grant had a terrible record. They were going bankrupt, and they couldn't afford to train people; they couldn't afford to do any of this stuff. Sears, who really had the best record, was also being sued, almost precisely because they had hired enough women and minorities that some of them got together and started agitating for more.

The companies were basically trying. It's a difficult problem—you need two sides of an argument, but I felt that this group was way too far over on one side. I certainly believed in hiring and promoting women and minorities, but I also felt these companies were genuinely trying to do their best. I mean, I'm sure there was some store manager who was a total jerk, but in the total scheme of things I thought they were trying. Maybe this kind of pressure made them do better, so whatever.

I learned an awful lot. It was the first time I'd seen an annual report of a company. But it wasn't what I wanted to do with the rest of my life.

Then I went to *Forbes*, and about the third story I checked was about a crooked mortgage banking company. Sort of by reverse engineering I learned how to understand an annual financial report, and a whole lot of stuff about accounting. And I did a few things on computer companies...

What time period was this?

This was '74 to '77. I decided I wanted to go to Japan and write about the

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Japanese computer industry. *Forbes* wouldn't pay for me to go, because I was pretty junior. so I said, "Look, I'll pay my own way, I'll take vacation time, but can I at least say I'm a *Forbes* reporter and set up interviews?" They'd have been crazy to say no, so they said yes.

I went to Taiwan, Hong Kong, and Japan for three weeks. I paid my own way. I was making, I think, \$10,000 a year, and the whole trip probably cost two or three thousand.

But it was totally worth it. It was simply wonderful. I had a ball, and I wrote a story for *Forbes* about the Japanese hardware threat and sort of said "Hardware is a threat, software is not." At the time, that was kind of interesting.

But I got tired of writing *stories*. I wanted to do something where my judgment was required, and I also didn't really have the kind of nasty cynicism that *Forbes* really liked and rewarded. So I went in to quit, and the editor said "Well, that's good, because you're a smart kid but you're just not cut out to be a *Forbes* reporter."

So I went onto Wall Street, to New Court Securities, which took Federal Express, Cray Research, and Tandem public. This gave me my early imprinting of what a good company is like. I sort of redid my Japanese Computer Threat piece as an analyst's report, which bothered my boss because he wanted me to be writing about specific companies.

But our biggest client from JP Morgan called up and said, "Who is the girl who wrote this thing? This is good!" And suddenly, "Oh Esther, you're so smart, you wrote this great thing..."

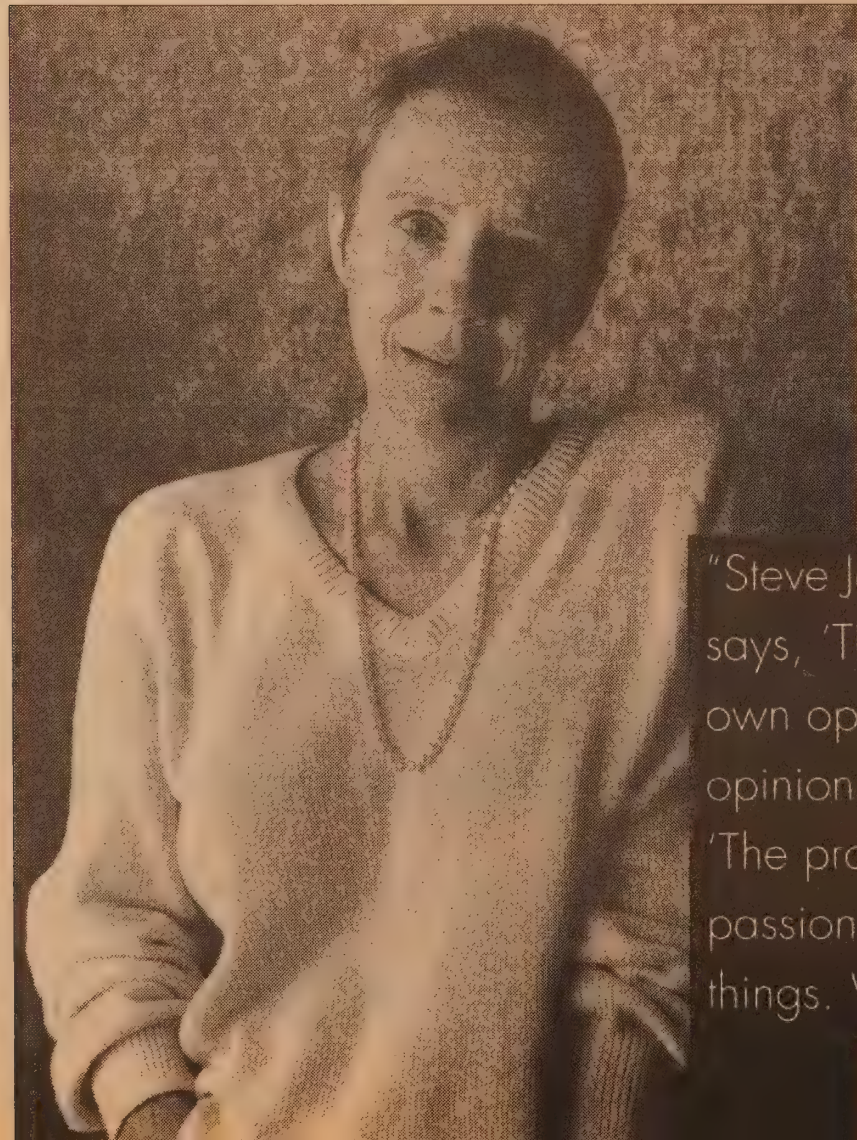
After two years there, I went to Oppenheimer and Company. At New Court, I was the research department; my boss was the sales department; there was one sales guy. It was great, because I learned everything. But I wanted to go to someplace more normal and establishment. Which I did, and I lasted about two years there.

Then I called up Ben Rosen who had, a year earlier, asked me if I wanted to come and write his newsletter for him.

What was he doing at that point?

He had left Morgan Stanley two years earlier. He had been the dean of the semiconductor analysts at Morgan Stanley. He knew this guy at Intel called Mike Markkula, who introduced him to this other guy called Steve Jobs. He brought the Apple IPO business into Morgan Stanley, and was honored but, he felt, not sufficiently rewarded or whatever.

PHOTO: CHUCK GATHARD



He left to start his own company called Rosen Research, and what had been the Morgan Stanley Electronics Letter became the Rosen Electronics Letter.

This was before Sevin Rosen?

Well, Sevin Rosen, which was his venture capital firm, started sort of at the same time, and that was his problem. He had a conflict of interest. Which is why he wanted to hire somebody to write the newsletter.

But it turned out everybody said, "Oh yeah, Ben's got this girl writing for him, who's probably just saying what he tells her to say. He's got a conflict of interest."

It was not at all true, but that's okay.

The most memorable time was when the Lisa had just come out, and I wrote something about it that I thought was fairly balanced: "It's pretty cool, but it's pretty slow, and it costs too much, but it's really neat and it has some neat ideas."

And Ben, who was now chairman of Compaq, read this, and he said, "Gee, that's much too favorable. And I said, 'Well, maybe, but this is what I think.'"

So I didn't change a word of it.

Steve Jobs reads it, and he says, "This is really terrible. It's okay if you have your own opinions, but trying to pass off your crummy opinions as those of Ben Rosen..." Then he said, "The problem with you, Esther, is you don't have any passion for this industry. You don't care about these things. What you really need is a good boyfriend."

Anyway, Ben and I decided that Ben had to sell the newsletter, because his having me write it wasn't enough. We talked to someone we knew at McGraw-Hill. We talked to someone at IDG. The response of both of them was a little too weird.

So in a blinding flash of insight it was totally obvious—I should buy it. So Ben took some cash out, in what was a leveraged buyout, although the term wasn't really being used at the time. And I got the business, including the conference.

Ben had started it when he was still at Morgan Stanley. He had this annual semiconductor conference, and, I think in '77 he decided, well, we'll have this little side-conference one of the afternoons about personal computers. And that was the first PC Forum.

Mike Markkula came and spoke about the new standard, the BASIC language. I think Nolan Bushnell was there. I wasn't, of course. I started going in '79 or '80. But by the time I joined Ben I'd been to several.

Were they pretty much like they are now?

Well, they were much smaller, and much less establishment, because it was the same people, but they were not yet the establishment. They were much more open to new ideas, they were open to new people, and were much more willing to share—"This is how we did it."

I liked this year [1993] better because there were more small companies, and you got more of that. The year before, you got much more of "how great we are," or "why you should use us"—they're not trying to sell products, but they are trying to sell *de facto* standards. This year was much more like the old days in that respect. This year I did what [Voyager's] Bob Stein said, which was, I designed it for myself.

What's really nice is everybody hanging out and everybody talking to each other, the strange connections in the hallways.

Yeah. I love it when people come up to me later and tell me, "I made a deal with so-and-so there." Two people who met at my conference in Warsaw are getting married in June. So that's always fun.

"Steve Jobs reads my review of the Lisa, and he says, 'This is really terrible. It's okay if you have your own opinions, but trying to pass off your crummy opinions as those of Ben Rosen...' Then he said, 'The problem with you, Esther, is you don't have any passion for this industry. You don't care about these things. What you really need is a good boyfriend.'"

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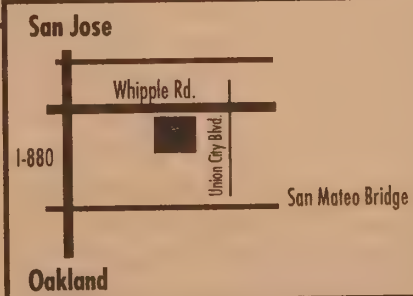
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"I love it when people come up to me later and tell me, 'I made a deal with so-and-so there.' Two people who met at my conference in Warsaw are getting married in June. So that's always fun."



I try to put new stuff in there. And I try to expose people to new ideas. Which, the first year or two, they don't get.

How did you get involved with the Eastern European and Russian stuff?

Well, I learned Russian when I was 14, in high school.

My father was a scientist, and he'd been to Russia a few times. In our family we knew the Russians were good, even though the Soviets were bad. I already knew German some and I knew French pretty well, because I'd been taking that since third grade, so it was Russian or Spanish or music appreciation or something. So I decided to learn Russian.

I always wanted to go there, but I didn't want to be a tourist, which meant that I never went until about four years ago. On New Year's Day [1989] I was having lunch with Gary Chapman [of CPSR]. He mentioned he was going to Russia with Sherry Turkle in April. I said, "Oh great! can I be your interpreter?"

He called my bluff, and the three of us went. It was really hilarious, because the three of us were a motley crew; we have no possible business purpose. This group who had invited us, the International Computer Club, was basically a trade association of computer users—it was quasi-government.

While we were there, there was also a delegation of real live German businessmen. So they completely ignored us, and we did what we liked. They arranged one or two meetings for us, and we went to a conference out in Suzdal about the informatization of Soviet society. There was a guy there who got up in the afternoon, and he said, "I'm from Estonia, and when we talk about the informatization of society, let's not forget the Estonians, it's not just Russians." He gave this impassioned speech.

It was an interesting time. They had just had the first Congress of People's Deputies, and everybody was excited, and they were probably more hopeful than they've ever been since.

I was giving this talk, and, since I'd come over as CPSR after a fashion, I decided to talk about some of these issues, such as privacy.

I said, "How many of you are afraid of your government? How many of you would be scared of your government if it knew all this information about you?" And I expected sort of dead silence.

And they all raised their hands and started laughing. [laughs] I was amazed. It was very funny.

Everybody we ran into—forget that none of us had any business to do—was asking, "Would you like to do a joint venture?" And we'd say, "To do what?" And they said, "Oh, I dunno, but, would you like to do a joint venture?"

I had brought James Gleick's book *Chaos*, I brought Francisco Varela's *The Tree of Knowledge*, and some others—meaty mind-expanding books, not crappy novels. I brought Sherry Turkle's book [*The Second Self*]; it was interesting to read it while she was there. It was incredibly synergistic.

In Russia, you sit around waiting an awful lot, and I lost my temper a couple of times because people were so damn slow, and they were always late, and we were always late, and I thought that was rude. And they said, "Just relax, Esther!"

While I was waiting I read these books, and they gave me a new way of thinking, and Russia gave me a completely new world to think about. In the end I learned more about the United States, because I learned more about the assumptions I was living by when I saw what life was like without them. It was a magical time.

I wrote a piece for my newsletter *Release 1.0* called "Three Weeks That Shook

My World." I thought, "Well, this is over; I'll write this piece, but there's not really a whole lot to do there."

And then in October one of the people I had met invited me back on some godforsaken Young Executives tour.

This was the fall of '89—the earthquake in San Francisco. The day after we arrived, we heard that California had sunk into the sea, basically, and we couldn't get any more information. It took a day or two to get a phone call through, and you couldn't call California at all.

We went to Estonia and they had a guide for us, and they were having this very boring lunch with some local dignitaries, and I turned to the tour guide, who was actually moonlighting—her normal job was being a dentist in a dental clinic. I said, "Let's go see your dental clinic." She said, "You're sure you don't want to see the museum?" "No!"

So we went to see her dental clinic...

It was an awful trip, but was still sort of fun, and I wrote that one up.

And then in December I went for the third time, and the first day was sheer horror. It's always like this the first day—it's just, "Why did I come back here? I really can't help these people. It's sort of stupid. What am I doing here? I'm only here for three days. It was really stupid to come."

This was a bunch of people organized by a guy I knew, about five, including two people from Met Life, kind of looking at the Russian computer business. They had arranged to go and visit Zelenograd, which is one of these military-industrial complexes just northwest of Moscow, and we were pretty close to the first Westerners. It was a pretty special thing.

But it was deadly. They had an interpreter, which meant everything lasted twice as long. They gave interminable speeches, and it was just incredibly boring.

The second day I told them I was very sorry, I had arranged some appointments, which is a complete lie, and I didn't go. I went and saw some people I knew, and the whole thing got much better. The third day I went and it was fine. We stayed for about a week and I did various things and saw various people with the group.

I went to Budapest because I'd just decided it was time to do more than just Russia if I was going to be serious about this at all, and get any Western companies interested. So I was in Budapest over the Christmas weekend when the Ceausescu were executed; that was about 200 miles away. It was all over Hungarian TV, not just the execution, but the Romanian riots, and all this stuff. The village where it all started was mostly Hungarian. People were in anguish.

The most amazing thing happened. I felt very homesick for Moscow. The next year, 1990, we had our first Forum in Budapest. Barlow came, Mitch came.

The biggest hero was Bill Joy. There were a lot of UNIX guys there, and Bill Joy spoke to a breakout session for four hours. And these people were sitting there delighted with every moment. It was just magical.

[Microsoft's] Charles Simonyi came—he's Hungarian, and for all the Hungarians that was really a thrill. His father still lives there, so he went to see his father.

Rustem Akhilarov, who now runs the software development department of a large successful Russian company—at the time he looked as if he'd escaped from kindergarten, with a long ponytail. He was beside himself at the thrill of meeting Barlow, who he knew about.

Mitch talked about being an entrepreneur and starting Lotus.

We played the Hawaii tapes, the first Apple sales meeting for the Macintosh. Steve Jobs was MC, with Fred Gibbons, Mitch Kapor and Bill Gates. These were the big three software companies, so these three presidents were there, sitting

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on large stools, and they were doing the software Dating Game. Steve was asking what they wanted in a hardware company.

Steve asked them their favorite three letters, and Fred said "M-A-C, S-E-X..." and then he sort of cracked up.

It was wonderful in that they were so young, and all this history was before them, and I thought it was a nice thing to show these people how our industry began in the West. And of course Mitch was there, so it was fun to see him ten years ago...

It was pretty neat.

And there've been two more conferences since then?

There was Warsaw, and then there was Prague, and this year probably Slovenia.

The community mostly doesn't exist yet. In Hungary, they all know each other. In Poland, less so. In Czechoslovakia, less so. They tend to talk to their customers, but not to each other. And until you know your competitors, you can't differentiate properly.

A funny, good thing happened though. I was talking to two of the Hungarians who had actually been at PC Forum, and also at East/West High Tech Forum, and we were talking about Slovenia. I said, "So yeah, it's going to be in Ljubljana." And this Hungarian said, "Ljubljana? You'll only get second-rate people there. You really should go somewhere real like Budapest." This same guy also said that he really didn't think it was appropriate to have all these Russians with more developed countries like Hungary and Czechoslovakia.

And of course this is exactly what everybody said three years ago about Budapest.

The moral of it is how quickly people become establishment and try to keep the people below them on the ladder down.

It was also the point I was trying to make with the Hawaii tape—even in those days they had picked the three establishment companies, and they picked completely wrong, with the exception of Microsoft. They missed Aldus.

So what do you see as your role in developing the Eastern European scene?

Well, the same as here. Find the new guys, and, to the extent that I can, help them discover each other and get self respect. You know, pass on knowledge.

The parallel that's simplest is Ben brought the PC community to the attention of Wall Street, and I'm trying to bring Eastern Europe to the attention of Western vendors. That's a somewhat grandiose statement, but that's what it's all about.

Eastern Europe doesn't need money as much as it needs business skills. It doesn't need technology. It needs stuff to buy, like hardware, but what it really needs is knowledge of how to run a company, how to support your customers. It needs more sense of community, too.

What is your sense of how many people are doing joint ventures with outside countries, and what people are doing domestic stuff?

As a percentage of the real market foreign activity is uncomfortably large, in the sense that it would be nicer if it were more Russian, although the foreign capital and know-how are available. But there's a lot of fairly large firms that are now Russian-controlled.

And it's changed a lot. In the beginning it was virtually all outside capital, or little programmer collectives. There is now Steepler, Intermicro, Microinform, IC—IC was a spinoff of the Lotus distributorship, and that's what's finally happening. People are learning how to do this, and then they're going out and starting it for themselves, which is great.

But what's also neat is some of them are now coming to PC Forum, which I like. They're being pretty much ignored, but time will change that.

What do they do?

They come and they listen and they meet a few people, and next year they'll come and they'll do more of it. It's hard for small Western companies too; they get ignored. It's hard to break in, whether you're a small Eastern company or a small Western one. And in the scheme of things, it's got to be, because there's only so much time anybody has to meet new people, as opposed to doing their old business.

But it would be beneficial if it was a little more open.

At one of Dick Shaffer's conferences last year, one of the panelists said that what's going on essentially is that we're back in 1977 and everything is changing. And everybody who's on top now might not be later.

Absolutely. That's the whole point.

Just as mini and mainframe people couldn't really do the PC business right, the PC guys don't know about wireless and PDAs. It is a different marketplace, and even if a lot of technology is the same under the covers...

The alliances have to be different.

Yeah, and you need more alliances, which is the other point. You could start a PC company in your garage. Even if you're in your garage you could go out and hire a lawyer, and you could get parts from Fry's.

But if you want to do a communications company, you have to deal with the infrastructure and the government. That's very different for a lot of these people, who built their lives on being independent and avoiding dealing with the government. There are legal issues, and intellectual property, maybe.

They're growing up now, and they have to deal with grown-up problems, which is a drag. It's not fun. You have responsibilities.

Do you have a sense of some of the big companies being smarter than others about some of this?

Yeah, I'm amazed at AT&T. Good for Kavner.

Apple may actually be one of the counterexamples. I really like the Newton; I'm not sure if Apple understands how to market in the new markets.

What about content?

It's the revenge of the little guy—you need to use the infrastructure out there, but you can be small and you can be nichey. In content, you inherently are, in fact.

How do you see all the intellectual property issues getting resolved?

How should they be resolved, or how will they? We'll muddle along and do little things here and there.

I believe in strong intellectual property rights, but I think as a business issue nine times out of ten you're better off giving almost everything away except for one piece. And that piece is what you earn your rent on.

As a practical example, what do you mean by that?

You know, like Adobe. Except for the very protected code of the interpreter, you can use PostScript pretty freely. Or, what Apple should have done with the Mac, encourage clones. I think that was a business mistake. It's amazing they overcame it.

And a counterexample is Datapoint, which had Arcnet long before Ethernet, but because they kept it proprietary they never got anywhere with it.

In terms of intellectual property on content, it gets much more complicated, but fundamentally people in computer industries just don't see the tradeoff part. If you own real estate, you have to go to a lot of expense to do a title search, you need to pay real estate taxes, you need to do things to protect your property rights. There's a whole bunch of people fundamentally doing what the Soviets would say is useless work, defining and protecting those property rights in land.

Computer people think, "Well, this is really inefficient, having all these monitoring and metering schemes and stuff." But that is part of the friction. Because somebody will write a great code for love. But somebody will support it, will document it, will do the printer driver as opposed to the beautiful elegant design—they'll do that for money.

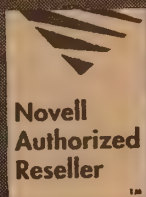
I'd be comfortable with something like a much shorter copyright term, five to ten years. Because after that, in this industry at least, it's pretty academic anyway.

On the other hand I really like the Cygnus model—which is, the software's free, we'll just charge for the service part of it. I'd like a world in which you could do the Cygnus model, but it wasn't forced on you. I think [the Free Software Foundation's Richard] Stallman is fine in what he's doing; I do not agree with him in what he's trying to impose on other people. It's fine, you can write stuff and you can force people to give it away freely, and that's okay. But you shouldn't force other people to give their stuff away freely.

At least in public, Stallman backs off from that a little. There are people who would like to characterize Stallman as a thief

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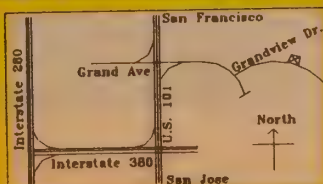
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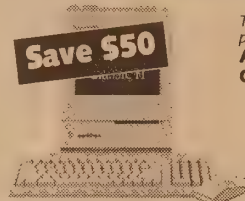
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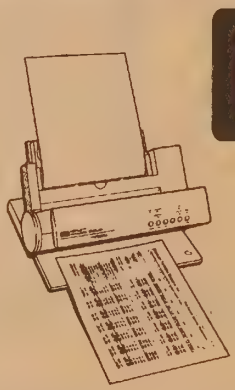
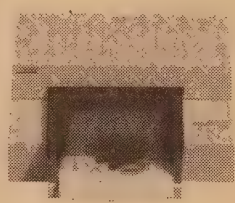


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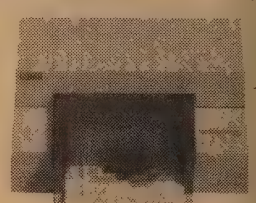


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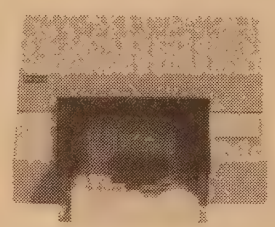
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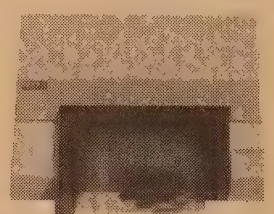
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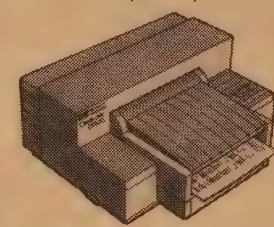
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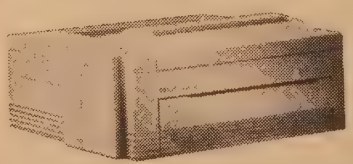
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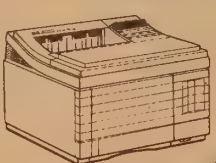
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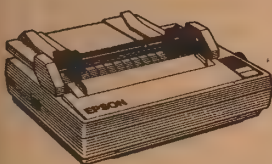
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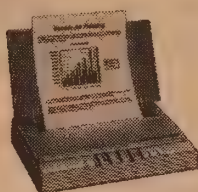
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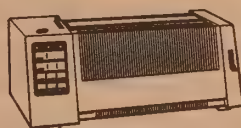
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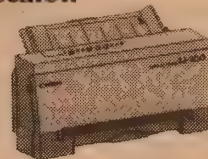
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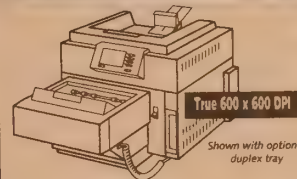
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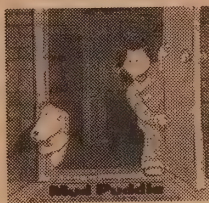
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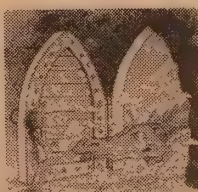
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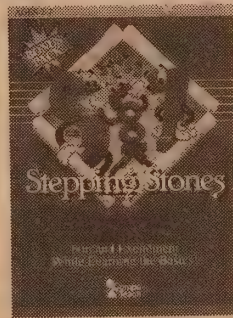
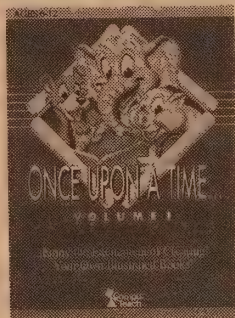
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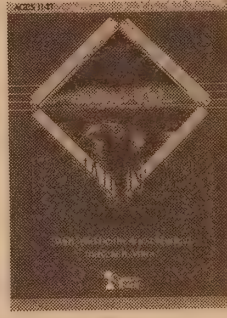
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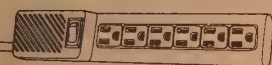
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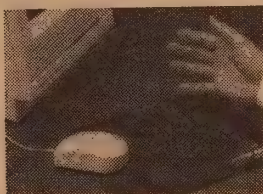
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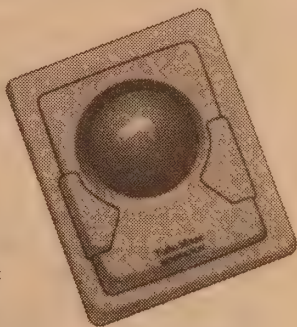
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continued from page 38

would want in a 486 notebook. But the addition of the printer sets this unit apart from the competition. Printer produces about two pages a minute; the quality is superb, with a resolution of 360 dpi.

The engineering of this machine is a joy to examine. Canon took their standard bubble jet printer mechanism and miniaturized it. The result is virtual laser quality. The actual working of the printer is also fascinating. Bubble jet printers normally have a print head and ink tank in a single unit. For this model, however, Canon has managed to separate these two elements in order to accommodate the limited space. The result is a print head (\$43) that lasts for about three thousand pages. The ink tank (\$48/six pack), however, lasts for only about sixty pages. The combined cost works out to about 14¢ per copy. While this is a good deal higher than standard bubble jet prints, it is highly sophisticated technology and well worth it when you need to print a few copies and don't have another printer available. But don't forget, there is still a parallel port on the back of the computer and you can easily hook up to any printer you like when one is available.

The computer comes with a NiCd battery

pack which should power the computer for between three and four hours and takes about seventy minutes to recharge. The printer takes a good deal of power. Canon claims that the printer will deplete the battery after eight pages, but tests showed the battery to last a good deal longer. Extra NiCd packs (\$135) are available as is a slightly more efficient and heavier Nickel Metal Hydride battery pack (\$186). As you might suspect, Canon has a very sophisticated power conservation arrangement and in fact supplies three different batteries with the computer. A lithium battery lasts five years and does nothing besides power the clock. Another internal battery keeps things going for up to ten minutes when you change the main battery.

The NoteJet 486 comes with MS-DOS in addition to Windows 3.1 and a marvelous tutorial. When you turn the computer on,

The NoteJet has all of the features you would want in a 486 notebook. But the addition of the printer sets this unit apart from the competition.

for instance, one of the options will be a BubbleJet tutorial. When you click the mouse on that option, you will be led step by step through the installation of the print head and ink tank. You can run the tutorial while you do the installation. Terrific!

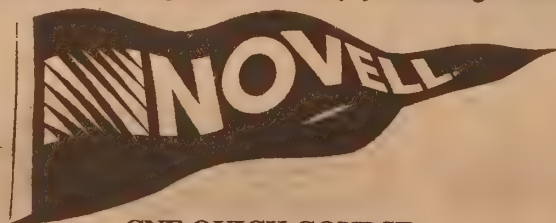
There are two carrying cases

available. A small one lists for \$49 while a deluxe model costs \$119. The unit comes with a one year door to door warranty and the documentation is excellent.

This is a first-class machine and makes a wonderful debut for Canon's new class of portable. I find the pricing quite reasonable as these models cost less than it would to buy a comparable computer and portable bubble jet printer. If I were in the market for a laptop, this is currently the one I would be examining. ■

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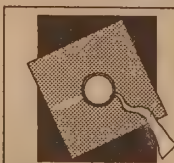


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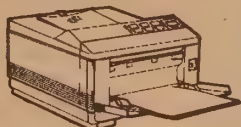
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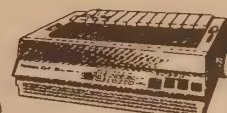
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Diamond Stealth 24 VLB 1MB DRAM S3-805.....	\$160
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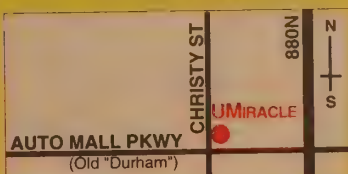
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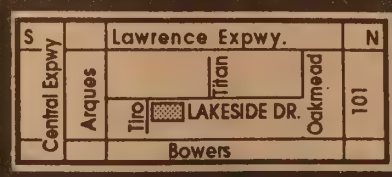
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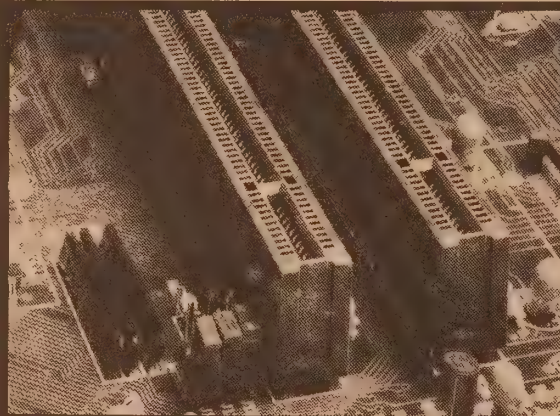
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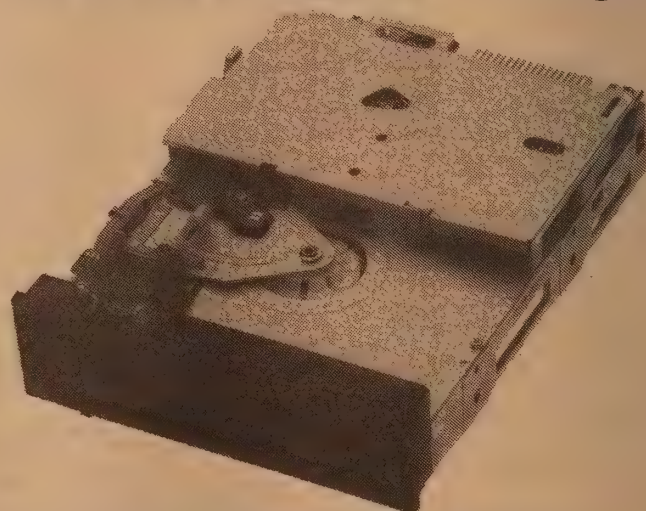
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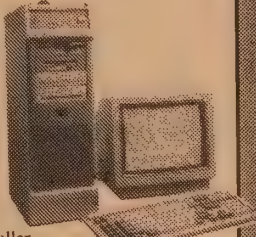
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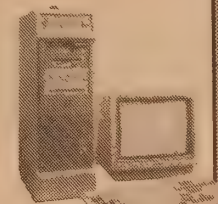
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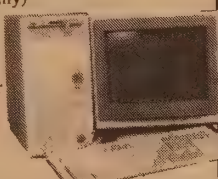
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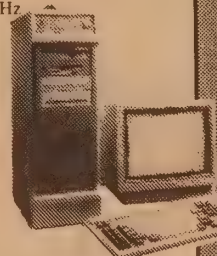
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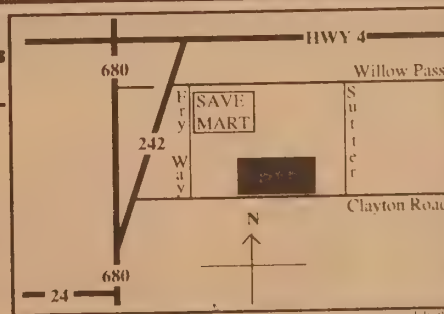


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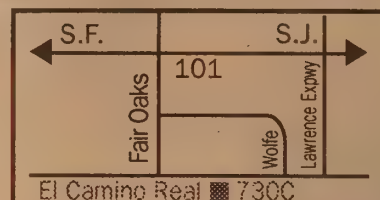
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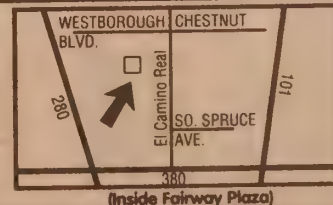
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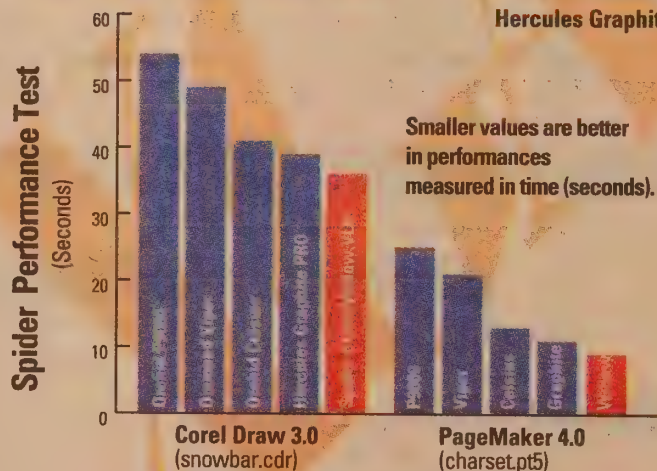
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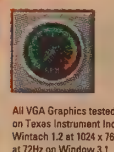
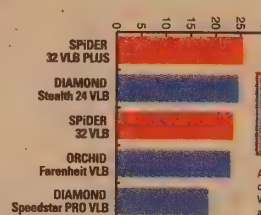
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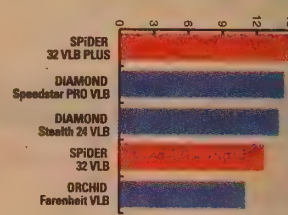
Tested on Spider Vesa 486-50MHz. Resolution was set at 1024x768x256 colors at 70Hz refresh rate. Comparison with real Windows applications using a stopwatch.

Performance Test	SPIDER 32 VLB PLUS	SPIDER 32 VLB	ORCHID Fahrenheit VLB	DIAMOND Stealth 24 VLB	DIAMOND Speedstar PRO VLB
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SPIDER 32 VLB PLUS	YES	YES	YES	NO	NO

(Test on 486-50DX with Windows 3.1 in resolution 1024x768x256 Colors, 1MB RAM on following motherboards chipset SIS, CONTAQ, OPTI, UMC, USA CHIP SET)



All VGA Graphics tested on Texas Instrument Inc. Wintach 1.2 at 1024 x 768 at 72Hz on Window 3.1



PC Magazine ZD Labs WinBench V3.11 test results were performed by Spider Graphics Inc. independently of any testing performed by Ziff-Davis Publishing.

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486DX2-66 ISA	\$758	\$758	\$758	\$758	\$1,589	\$1,703	\$1,828
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486DLC-33 ISA	\$339	\$339	\$339	\$339	\$1,169	\$1,284	\$1,409
486SLC-25 ISA	\$296	\$296	\$296	\$296	\$925	\$1,127	\$1,241
386DX-40 ISA	\$285	\$285	\$285	\$285	\$914	Corporate Buyers 48 hrs On-Site plan available	
386SX-33 ISA	\$244	\$244	\$244	\$244	\$873		
286-20 ISA	\$221	\$221	\$221	\$221	\$850		

Free mouse w/ all systems

VLB Machines have VLB IO/IDE and VLB 1MB SVGA

This Matrix is updated frequently, please give us a call and we will fax you the latest version

VAR's and reseller's call for our reseller matrix.

All Basic Configurations [systems] include Motherboard, 1MB RAM, Mini Tower Case, IDE [1:1] Controller, 2SPG, 1.4 Floppy, 101 Keyboard

All ASA build systems have an in-house system warranty of three years.

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Power	486-66 256K CACHE	486-66 256K CACHE	486-66 256K CACHE	486-66 256K CACHE	486-66 256K CACHE	486-66 256K CACHE
Video Power*	50 winmark	26 winmark	50 winmark	42 winmark	16 winmark	16 winmark
RAM	8MB-70 exp to 128MB	8MB-70 exp to 64MB	8MB-70 exp to 32MB	8MB-70 exp to 64MB	8MB-70 EXP TO 32	8MB-70 EXP TO 256MB
BIOS	DIAMOND	PHOENIX	AMI	AMI	AMI	AMI
Exp. Slots	2 VESA, 5 ISA	2 VESA, 6 ISA	2 VESA, 5 ISA	2 VESA, 6 ISA	2 VESA, 5 ISA	2 VESA, 6 ISA
Floppy Drives	1.2, 1.44 Teac Drives	Same	Same	Same	Same	Same
HFC/IO	32 bit orchid VLB	32 bit orchid VLB	32 bit orchid VLB	32 bit orchid VLB	32 bit orchid VLB	Promise w/2MB Cache
Case, 230 UL	Med Tower 230 PS	Same	Same	Same	Same	Same
Keyboard	Keytronic/Maxi Switch	Same	Same	Same	Same	Same
Video Card	DIAMOND-VIPER	ATI-ULTRA PRO	ORCHID CELSIUS 9000	LEVEL 11	ORCHID Farenheit	ORCHID Farenheit
Spc. Features	2MB VRAM	2MB VRAM	1MB VRAM	2MB RAM	1MB DRAM	1MB DRAM
	1280X1024X256Clr 74Hz NI	1280X1024X16Clr 74Hz NI	Same	Virtual rsltn upto 2048x1024	1280x1024 16clr 60Hz NI	1280x1024 16clr 60Hz NI
	1024x768x66Clr, 76Hz NI	1024x768x66Clr, 76Hz NI	WEITEK P9000	1024x768x66Clr, 100Hz NI	1024x768 256clr 72Hz NI	1024x768 256clr 72Hz NI
32bit Proc	WEITEK P9000	MACH32	WEITEK P9000	S3 928 GUI Accelerator	S386C805	S386C805
Video Mnfr #	408-736-2000	416-756-0711	510-683-0300	617-674-0009	510-683-0300	510-683-0300
Price	\$1,640	\$1,852	\$1,544	\$1,912	\$1,406	\$1,762

All CPUs have a cooling fan with heat sink.
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* PC magazine 2.5

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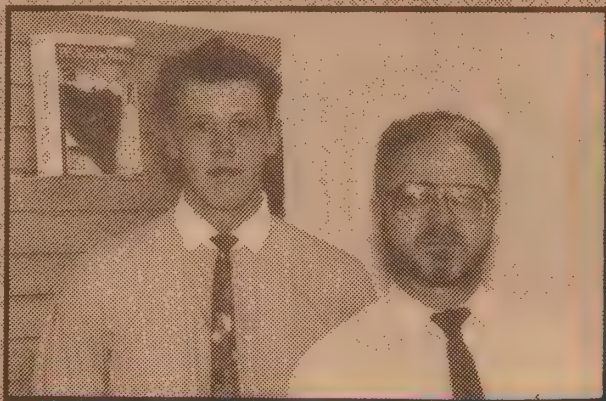
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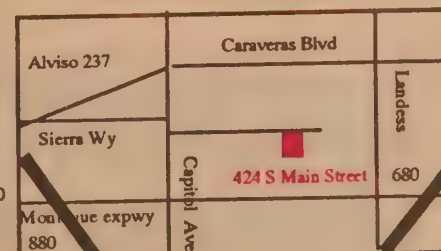
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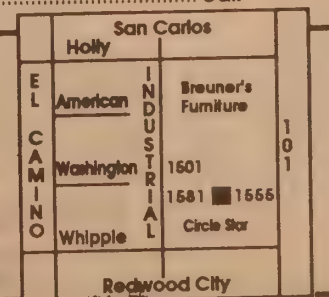
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When I discussed hardware and software considerations for OS/2 last month, I was expecting to start this month with the installation of OS/2 2.1. Based on experience I should have known better. First, 2.1 arrived a few days prior to the deadline. Second, preparing for installation, I realized that there are some very tricky planning issues that need to be discussed first.

How to best install OS/2 is specific to individual circumstances: are you a first time user, or an upgrader to 2.1? How much disk space do you have and how is it distributed on what kind of storage devices? Do you run DOS, Windows, or both? What kind of applications do you use, how frequently do you use them, and what do you plan to add? How large are your data files, and what is their estimated rate of growth?

Since these details determine the optimal installation, the best I can do is to discuss my circumstances and point out more general implications wherever possible.

My hardware configuration is as follows:

- EISA 486/33 system, Phoenix BIOS by Micronics
- EISA SCSI adapter, 4MB cache (bus-mastering) by DPT
- SCSI 210MB hard disk, 19ms access time
- 16bit I/O card, 2 parallel, 2 serial ports by Quatech
- EISA SuperVGA video card, 2MB VRAM by ATI
- 14,400bps internal faxmodem by Intel
- Multisync 16" color monitor by Nanao

I run DOS and OS/2 applications, but no Windows. And I plan to install many more OS/2 applications, particularly SQL DBMSs.

REAL DOS

OS/2 comes with a DOS emulator which

Your life will be much easier if you create one or more separate OS/2 partitions for applications.

can multitask DOS applications in full screen or windowed sessions called Virtual DOS Machines (VDM). Most DOS applications will run—albeit, some only with tweaking—in VDMs. Preserving the ability to boot real DOS (preferably 5.0), however, is a good precautionary measure. If and when some DOS applications or utilities encounter difficulties with VDMs, or you lose access to OS/2, booting DOS will prove a savior.

If you run DOS, you already have a DOS bootable partition, which stores programs and data. The question is how much space it leaves you for OS/2, if any. OS/2 program and data files are usually much larger than DOS ones, and if your DOS partition does not leave you at least 150MB free for OS/2, you need to reduce your DOS partition

(which means backup, repartition, format, and restore), or get more storage space.

When I initially installed OS/2 2.0, I reduced my DOS partition to about 50MB because, without Windows, I did not need more. This left me about 160MB for OS/2, which I used as one partition for both the operating system and applications. At that early time I was just being conservative, and did not take full advantage of OS/2.

PRIMARY VS. LOGICAL PARTITIONS

DOS boots only from a primary partition, while OS/2 can boot from either a primary or an extended partition. Two primary partitions cannot be active at the same time, so if you also put OS/2 in one, then you will not be able to access it with real

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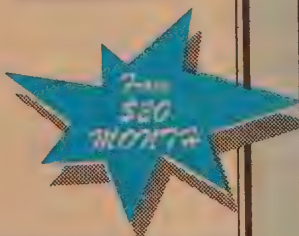
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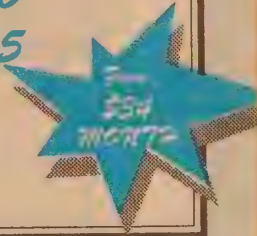


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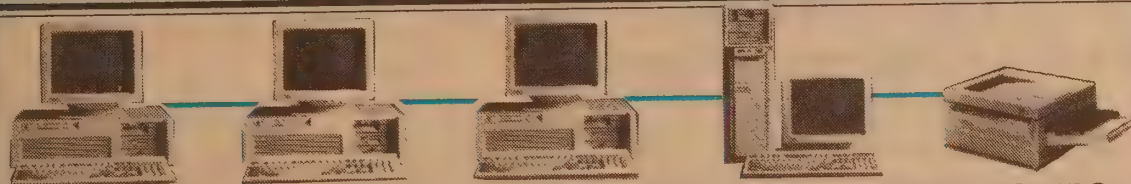
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DOS (which is already on a primary partition) if you ever need to (or vice-versa).

You need to create an extended partition for OS/2. This will ensure mutual access by real DOS and OS/2 to each other's partitions (with the exception described in the next section). Note that OS/2's DOS emulator *must* be able to access the DOS partition to multitask the applications stored there. (By access from real DOS I mean *read* access. As we shall see in future columns, you should

not *write* to an OS/2 partition from under real DOS, but use only the DOS emulator for this purpose.)

Should there be only one logical partition for OS/2? OS/2 installation creates a complex directory structure on the hard disk, and stores hundreds of files in it. This should not be of much concern, because you will rarely need (or even want) to understand the files, or handle them directly. But if you start storing OS/2

applications on the same partition, it will be difficult to distinguish their files from those of the operating system itself, particularly when fixes and upgrades to either become available. Therefore, your life will be much easier if you create one or more separate OS/2 partitions for applications. How many depends on your applications and data, available disk space, including backup, your own organizing preferences and, as we shall see shortly, some OS/2 performance characteristics.

IBM puts the storage requirements of OS/2 itself between 20–45MB, depending on what features you choose to install. I, for example, will not install WINOS2, the new multimedia features, the games, and most of the built-in applets, saving around 20MB of space. This will enable me to put OS/2 on a partition as small as 30–50MB, which still allows for reasonable growth. Now you can see why less than 150MB is not enough for OS/2: it leaves about 100MB for applications, and given OS/2 file sizes, they are likely to fill the space pretty fast.

My existing 160MB OS/2 partition is reasonable for starters, but my problem is that I have only one. To split it in two to separate between OS/2 and applications requires repartitioning and reformatting the hard disk, then reinstalling DOS, OS/2, and applications from scratch, which would be a pain. The only alternative is to get a second hard disk. This is where a SCSI adapter comes in handy, because it can drive up to seven SCSI devices.

The best I could do was 245MB, but a new hard drive raised another question. As I already explained in an earlier column, it is risky to run OS/2 without a backup safety net, and a separate physical drive is preferable for this purpose. A removable drive is the best, because it offers infinite backup space. But my old Bernoulli went on the fritz, so until I could get my hands on another removable drive, the two hard drives would also have to accommodate backups. Since I had only one 160MB partition on the old drive which would not allow me to separate between OS/2 and applications, I could not install 2.1 over 2.0.

Fortunately, as long as one has DOS or OS/2 already installed, the upgrade version of 2.1 will actually install OS/2 from scratch on its own partition, not just upgrade 2.0, as its name implies. Installing 2.1 on the new drive will lose customization such as the graphical desktop, and no reliable tool to migrate customization from 2.0 to 2.1 is yet available. But on the other hand, it is a safer procedure. If any problems with 2.1 pop up, I'll still be able to boot 2.0 and do my work. I can move the applications to separate

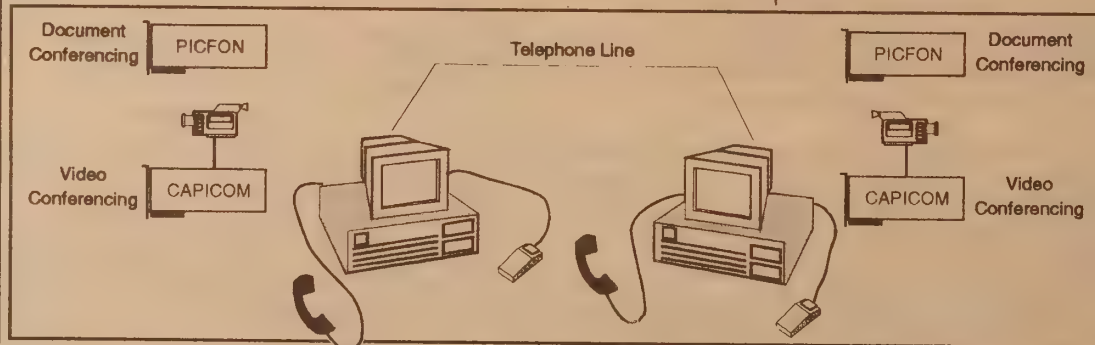


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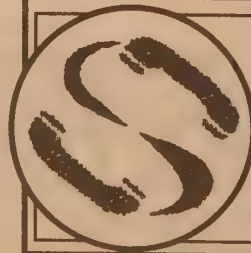
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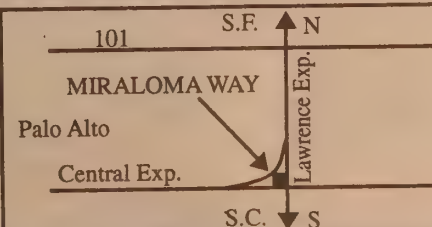
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- 1 parallel, 2 serial, 1 game port
- Enhanced 101-key mechanical keyboard
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- Ergonomic desktop chassis with 200W power supply

Option:

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SX33	\$1259	~~\$1275~~	\$1310	\$1345	\$1450
DX33	\$1385	\$1405	~~\$1435~~	\$1470	\$1579
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- 6 ISA slots
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- 3.5-in. floppy drive
- 1024 x 768 SuperVGA adapter, with 1Mb RAM
- 1 parallel, 2 serial, 1 game port
- Enhanced 101-key mechanical keyboard
- 14-in. SuperVGA color monitor, 1024 x 768
- Prestigious molded chassis with 200W power supply

Options:

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- 128Kb cache
- 4Mb, 70ns high-speed memory, expandable to 128Mb
- 8 EISA slots
- 2 VESA Local Bus slots: 1 master, 1 slave
- 3.5-in. floppy drive
- 1024 x 768 SuperVGA adapter, with 1Mb RAM
- 1 parallel, 2 serial, 1 game port
- Enhanced 101-key mechanical keyboard
- 14-in. SuperVGA color monitor, 1024 x 768
- Ergonomic mid-tower chassis with 200W power supply

Option:

- Upgrade SuperVGA adapter to 1Mb VL adapter [\$50]

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Hard Disk Management For DOS

BY LENNY BAILES

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Norton Backup, v. 2.2

The Norton Utilities, v. 7.0
Symantec Corporation
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Cupertino, CA 95014

Caring for your hard disk is important for a successful computing experience. Setting the disk up properly can save you time and make your computing experience more rewarding. Proper maintenance can save you the chore of replacing or reconstructing lost work.

Backing up your data is the surest safeguard against disk failure. Even if you back your hard disk up conscientiously, it won't last forever. A number of utility programs are also available to keep the disk running soundly. Maintenance utilities can help prolong your hard disk's life.

Selecting a suitable hard disk is also a key element for successful computing. If you've just recently purchased a system, you will probably have 80MB or more of disk storage space. If you plan to keep up with state-of-the-art packages and run a variety of software, 120-200MB is better. There was a time when 40-80MB was sufficient to handle word processing, spreadsheet management and database accounting, but the advent of Windows has changed that. Some people may still make do with older 40-80MB drives, but even trusty DOS pack-

dismay, when I attempted to RLL a 120 MB ATASI drive, to give it 200MB of storage space. This worked beautifully for a while, but after a few months I started getting mysterious disk read errors, and the drive gradually became unreliable. Utilities like Gibson's Spinrite and Norton's Calibrate can sometimes be helpful in restoring a disk when it starts to go wrong, but they can't remedy errors caused by overtaxing a drive's natural capabilities.

IDE drives have the advantage of being preformatted at the factory. (They are also generally faster than the older MFM/RLL drives). ESDI drives are also fast; however, they cost more and require more expensive controller cards. SCSI drives are less expensive than IDE per unit disk space. They are popular among users willing to invest more time in installation. SCSI drives are generally sold in larger sizes.

SETTING UP A HARD DISK

When you begin to use your computer, you may be tempted to save files in the same directories where your programs are

struct batch files for file maintenance—copying and deleting groups of files or relocating subdirectories.

The DOS Path statement helps you to start your programs. You may have had the experience of typing a program name from the DOS command line and getting a "File Not Found" message. By specifying the names of individual subdirectories, the Path statement lets you launch a program no matter which directory is current on your disk. To add a directory to the path, use the Edit program supplied with DOS to open a file called "autoexec.bat", found in the root directory of your C drive (C:\). Look for the statement that begins "Path=", and add the new directory to the end. If no path statement appears in Autoexec.bat, you may create one. For example:
`Path=C:\DOS;C:\UTIL;C:\BAT`
tells DOS to search in the DOS, UTIL and BAT file directories on your disk whenever you type in a program name at the command line.

In this modern day of computing, many people make use of menu systems to start their applications, instead of typing them in at the C prompt. Microsoft's DOSShell allows the construction of menus, and is included with the DOS operating system. Try starting DOSShell and exploring some of its options.

WORKING WITH FILES

When you save your data files, you may take advantage of DOS's variable three-letter file extensions. Some programs will automatically suggest an extension such as .DOC for a word processing document, .WK3 (LOTUS spreadsheet), .DRW (AUTOCAD drawing), or .PCX (Paintbrush picture).

The eight-letter file prefix can be used to suggest a name and date. Unfortunately,

Utilities like Gibson's Spinrite and Norton's Calibrate can sometimes be helpful in restoring a disk when it starts to go wrong, but they can't remedy errors caused by overtaxing a drive's natural capabilities.

ages have increased considerably in their storage space requirements.

I learned the penalty for hard disk greed with a solid MFM drive. RLL provides up to 150% the disk space of MFM with a compatible drive, but alas, not all MFM drives can be safely RLL'D. I discovered this, to my

installed. Eventually this results in clutter.

If you create batch files to run your programs or customize the system, you'll want to store them all in a common directory, rather than letting them accumulate in the root and program directories. Experienced DOS users have also been known to con-

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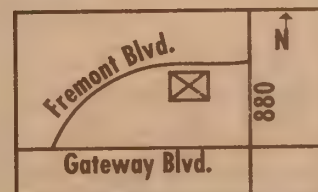
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DOS does not have the capacity to allow full English names and dates for documents. (The Macintosh Finder has been able to do this for years, and OS/2 now allows English filenames of up to 254 characters. Windows allows extended filenames only for specially associated files that have been placed in Program Manager groups.)

Examples of good DOS filenames are INV0612.w51 (invoice dated June 12, created in WordPerfect), BROCH01.CDR (first brochure created in CorelDRAW), Jonltr.214 (letter to Jon dated February 14). Whichever system you use to assign names to documents, consistency will help you retrieve them later. Whether to use the three-letter file extension as a program, date, or document type is an individual decision that depends on you. The software you use may influence your decision.

As you continue to work, you may find that the directories and files on your hard disk begin to proliferate. This may affect both the time it takes to find files and the speed at which your programs operate. When many files accumulate on the hard

disk, performance tends to slow down because DOS won't always save the files in consecutive order. To remedy this situation, you may optimize the storage of files on your hard disk with a disk optimizer. The one included with DOS 6 is called "Defrag." It is a simplified version of a program called "SpeedDisk" that is bundled with Symantec's Norton Utilities.

A disk optimizer reorganizes the file structure of your hard disk by relocating files and placing individual pieces of a file into consecutive order on the disk. The latter process is called defragmenting the disk. When DOS first writes your files to disk, it searches for available contiguous space, but may sometimes store data in nonconsecutive addresses. The disk optimizer "defragments" the drive, making it easier for data to be retrieved. The advanced defragmenter that comes with Norton offers a number of options to make it easier to navigate your disk. Files may be rewritten in alphabetical order or in date order within subdirectories; directories that contain programs may be placed at the front of the disk (decreasing

the time it takes for them to load). You can also specify whether to include hidden or read-only files in the optimization process. (Some programs leave small, hidden maintenance files in individual subdirectories, or in your root directory.)

The disk optimizers included with DOS and third-party add-on packages give you a choice: you can simply defragment the disk, or the program can perform a complete reordering of the file structure. The latter choice compacts the disk by packing all files consecutively at the front of the disk, removing the disk space between the files. This increases the amount of real storage space you have on the drive, making room to write large files at the end of the disk.

Occasionally, you may discover that you delete a file by accident. Sometimes computer programs fail when saving files or during installation. In case of emergencies, DOS provides you with a few utilities to rescue data. The Undelete utility, based on a program from Central Point's PC Tools, can restore erased files to the disk in many instances. (Both the DOS and PC Tools pro-



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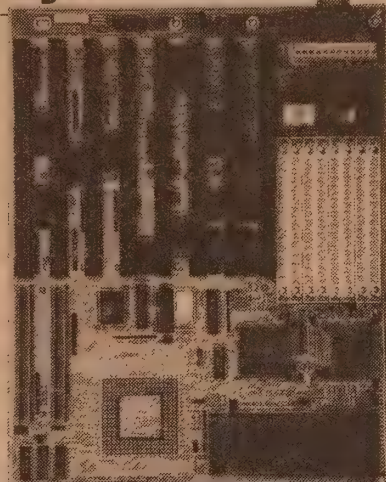
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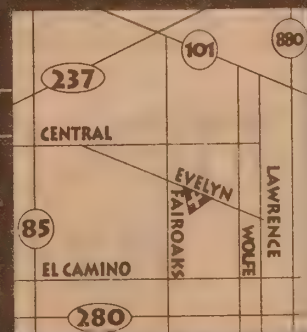
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grams are based on Norton's "Unerase," the original file restore utility for MS-DOS based machines.)

The backup program included with DOS 6, based on Symantec's Norton Backup, is a big improvement over Microsoft's previous backup utility. It allows you to select directories and files visually, and set more filters for archiving and restoring. Microsoft's pared-down version of Norton Backup does not support tape drives. The full Norton Backup supports a wide range of tape drives (although not as many as Central Point's CPBackup).

Version 2.2 of Norton Backup now supports high speed tape backup systems from Colorado and other vendors. Its installation program is automatic and painless. My only objection to the program is that it does not provide file comparison reports to show which files fail verification tests. Central Point's backup program writes reports that let you see at a glance which files don't match the originals on the hard disk. (If you use a tape drive, it's important to select the file verification option, since tape drives are still less reliable than floppy diskettes as backup media.)

When many files accumulate on the hard disk, performance tends to slow down because DOS won't always save the files in consecutive order. To remedy this situation, you may optimize the storage of files on your hard disk with a disk optimizer.

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In the event that you accidentally delete data from your hard disk you may appreciate the undelete utility included with DOS 6. It includes a few new features licensed from Central Point's version. Now you can maintain a hidden area on your hard disk that actually stores deleted files for a specified period of time. In DOS 5 the Undelete utility could track file deletions in case you wanted to reclaim a file. In my experience Norton's Unerase is a slightly better file recovery program than Undelete, but it is not included with DOS. The chances of reclaiming an accidentally deleted file are pretty good with all three recovery utilities if you use them soon after you discover your mistake. (Central Point's offerings for DOS 6 have yet to be released.)

It is said that the average life of a good hard disk is about five years. This may depend upon the demands you place upon it. Many people have upgraded their systems in shorter periods of time to take advantage of the greater speed provided by newer models. In the event you do encounter read errors on your disk, both Symantec and Central Point offer utilities that attempt to correct them. Calibrate and Diskfix scan a drive "sector by sector," writing test patterns to disk to correct defects. In my experience these utilities are not always successful in correcting problems and may actually make things worse. To their credit, they do provide diagnostic information and can warn you if all is not as it should be.

The state-of-the-art package for everyday computer users in this field is Steve Gibson's Spinrite. I've never known Spinrite to interfere with a disk's operation, and have seen it correct errors and restore a disk to full working capacity. Currently, version 3.1 of Spinrite, adding support for IDE hard drives, is pending release.

Taking care of your hard disk is a simpler task now that Microsoft and third party vendors have provided maintenance utilities. Your budget and your involvement with day-to-day maintenance of a PC should be your guide to which packages are essential for your computing needs. ■

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BY: HUGH R. CLARK, PH.D.

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In our constantly shrinking world, people from different cultures, speaking and reading different languages, must interact regularly. Therefore communication across the boundaries of culture and language has grown ever more important. As the people on both sides of the Pacific and the languages they speak come in more frequent contact, the ability to make that communication will be ever more critical.

TwinBridge 3.1A, the newest edition of the multilingual programs from PCExpress of Rosemead, California, can't teach you the languages themselves, but it is the easiest and most versatile solution to date for those who have wished they could insert foreign language characters into English-language documents. The program combines with Windows to make inserting Chinese, Japanese, Greek, or Russian into English texts as easy on PCs as it has long been on the Mac.

This is the ideal program for people who need to compare translations or transliterations of foreign terms in English documents with the foreign original. It is equally essential for those who compose documents or correspond in Chinese or Japanese, using their regular English word processing program rather than the often awkward foreign programs.

TwinBridge 3.1A combines all the flexibility of powerful programs such as Microsoft Word for Windows with ready access to over seven thousand Chinese characters in as many as eight separate character fonts. In addition, the program supports Japanese kana, including both hiragana and katakana, plus the Cyrillic and Greek alphabets. It is further supported by a built-in Chinese phrase dictionary with over fifty thousand phrases of two to four characters, as well as an English-Chinese dictionary composed of over five thousand words and phrases.

USING TWINBRIDGE

TwinBridge 3.1A is a WYSIWYG program, and is designed to work in conjunction with all the Windows internal applications, including Write and Paintbrush. It also supports a wide range of software designed to work in the Windows environment, including Word, Excel, Freelance Graphics, Harvard Graphics, Lotus 1-2-3, PageMaker, Peachtree Accounting, Quicken, and a host of others.

TwinBridge does not support DOS programs accessed through Windows, including the DOS versions of the above programs. While somewhat workable in these contexts, it is also not fully reliable with other programs adapted to the Windows environment, such as WordStar or WordPerfect for Windows, neither of which reliably embeds the characters into text.

Like most programs designed to enable the joint use of Chinese with other languages, TwinBridge functions as an interface between the operating system and the application program. When you're using Windows applications, or any compatible application program such as Microsoft Word for Windows, the application program functions normally. When you want to add foreign characters to your English text, you activate TwinBridge within the application program by a simple keystroke. After making the insertion, you then toggle back to English and proceed normally.

As an additional benefit, you can compose documents entirely in any of TwinBridge's multilingual formats without leaving your application program. This means you can write letters, compile databases, etc., in any of the foreign character formats and still take advantage of the strengths and flexibility of the programs you are already familiar with.

Using power and flexibility it derives from the Windows environment, TwinBridge

offers considerable advantages over its predecessors. Among the most significant is the ability to readily switch between the font options of your application program and as many as eight Chinese character fonts. The fonts include options in both traditional and simplified characters, which are important for anyone corresponding with people on the mainland. As an alternative to switching between the TwinBridge character fonts and the fonts of your application program, you can work entirely within the TwinBridge fonts, which support a standard Roman typeface for entering English. (Note: do not be deceived by the appearance of this typeface on your screen, where it will look somewhat different from standard Roman fonts. When printed, this font is indistinguishable from the Windows Roman font; this is one of the rare instances in which TwinBridge is not WYSIWIG.)

Entering characters into a document is simple and direct. TwinBridge recognizes seven options for entering Chinese. Most users will probably use the Pinyin method, a widely known system for transliterating standard spoken Chinese. Because Pinyin is based on our own alphabet, it can use the standard American keyboard layout and so does not require learning any special keyboard settings.

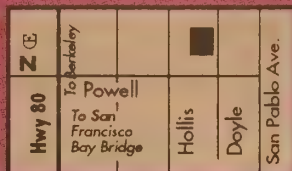
On toggling into the TwinBridge input mode, the program displays several dialog boxes on a single line at the bottom of your screen. The Pinyin transliteration you enter appears in the "input" buffer. Once the program recognizes a transliteration, the "selection" buffer displays all the possible characters, from which you make your choice.

As one alternative to Pinyin, TwinBridge also recognizes the Zhuyin transliteration system. Zhuyin, used widely in Taiwan, is based on a set of specialized phonetic symbols. TwinBridge uses the standard

continued on page 222

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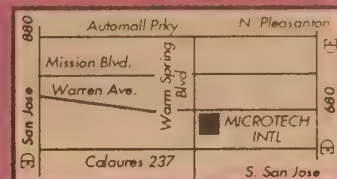
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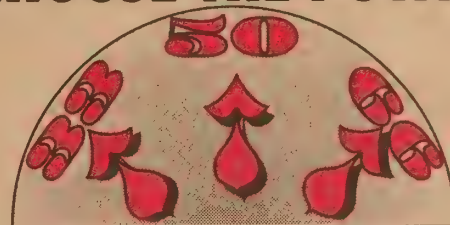
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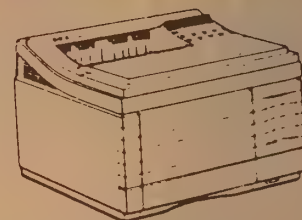
FOR PC/WINDOWS USERS

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HP LaserJet 4m

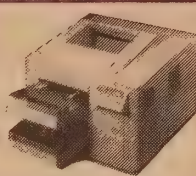
FOR MAC/PC Environment

This printer sets a new standard in business printing for Macintosh and mixed Mac/PC environments. With 600-dpi resolution, it produces near-typeset-quality documents. Integrated PostScript Level 2 software from Adobe gives users access to 35 Type 1 typefaces, and they can download thousands more. Automatic printer language and I/O switching makes it easy to share the printer between Mac and PC users.



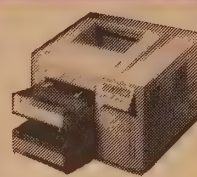
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HP LaserJet 4Si



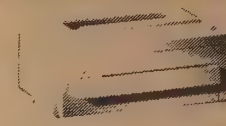
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HP LaserJet 4SiMX



The HP LaserJet 4SiMX is a high-speed, high-volume, high-resolution laser printer designed for multiple network environments. It offers simplicity in complex network environments.

HP LaserJet 4ML

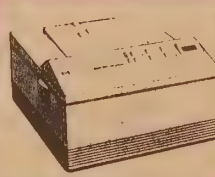


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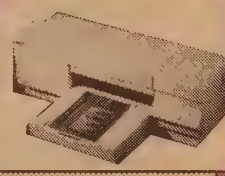
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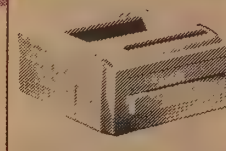
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HP LaserJet 4L



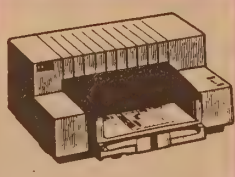
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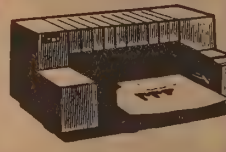
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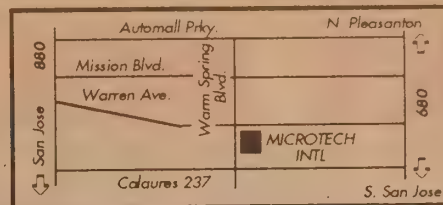
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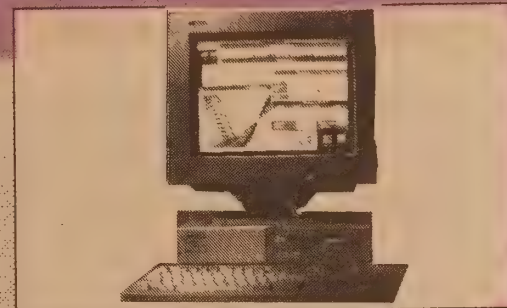
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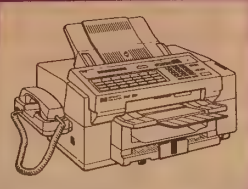
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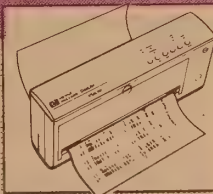
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- 32 greyscale level

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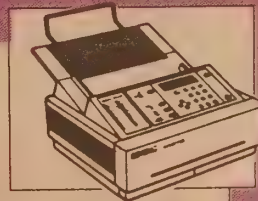


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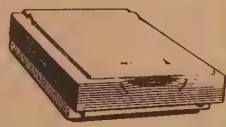
HP ScanJet Scanners

IIP

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- 256 grayscale levels

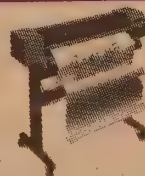
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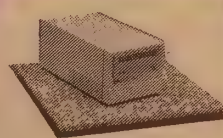
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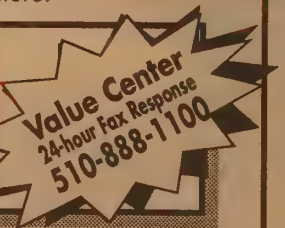
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PC Anti-Viral Products

Software That Works, Issues To Consider

BY A. LIZARD

This review is not exhaustive; it simply reviews the virus protection packages that performed best under the tests described below, with the intent of showing products that are known to work well.

There are several types of virus protection software, of which the signature scanners are the best known and most widely applicable class. The programs reviewed in this article are primarily signature scanners: they look for strings of bytes which uniquely identify code sequences found within viruses analyzed by the vendor (signatures). The strength of this approach is that it can find as many viruses as the size of the database allows. The weaknesses are that the scan will miss a new virus with no signature listed or a virus with its characteristic signature altered; also, some viruses have built-in encryption and, in some cases, polymorphic (self-altering) code to make it impossible for signature scanners to detect.

The race between virus creators and anti-virus software manufacturers accounts for this software being so frequently updated, and is the most urgent reason that users should get the latest updates as soon as they come out. It's also a good idea to use two or more virus scanners, since one product may have signatures the other lacks.

The best way to select an antiviral program is to sit down and do extensive research, use VSUM and check the monthly certifications, read books on viruses (*The PC Virus Control Handbook* by Robert V. Jacobson looks good), articles about viruses/scanners in computer magazines, or on newsgroups or online services or BBSes. The products listed here are safe choices that can at least show demonstrated effectiveness against viruses.

As far as I'm concerned, the only real questions worth asking about a virus package are:

A product that misses 2% of viruses tested is probably not a problem, unless the virus that crashes your system is part of the 2%.

DOES IT WORK ON A WIDE RANGE OF VIRUSES?

To check the effectiveness of an antiviral program:

1. Do it yourself.

a. Dedicate a computer specifically for this purpose; you don't want to risk your personal and business files to a machine you are deliberately infecting with viruses.

b. Put some typical applications and files on it, things you wouldn't miss anyway.

c. Get some viruses. This generally takes some rather unusual connections in the BBS community, or becoming known as a reputable virus researcher. There are over a thousand viruses you will have to get before you will have enough to work with.

d. Now try your scanners.

2. Get the test results from neutral sources that have done the above.

I am using results from the sources listed. The two most common shareware anti-viral packages—Frisk's F-Prot and McAfee Scan—show better results on two leading

test suites than the best of the commercial shrink-wrapped packages.

These NCSA numbers are from the National Computer Security Association viral test suite. (While the organization no longer periodically publishes tests, they did test some selected packages for me. I'd like to acknowledge its valuable assistance and in particular, that of Bob Bales in putting this article together.)

The VSUM numbers are from the viral database and certification program run by Patricia M. Hoffman. She runs a manufacturer service for testing products against her extensive database (1,956 viruses) and certifies their performance in the monthly certifications which are part of the VSUM hypertext database.

The filename is VSUM.ZIP and is updated monthly. The virus descriptions are interesting reading, the hypertext interface is a pleasure to use. However, this one you may simply want to mail-order rather than download if your modem is 2400 baud or

Copyright © 1993 by A. Lizard. All rights reserved. A. Lizard is an electronics engineering and computer consultant with Reptilian Associates. He can most reliably be found in cyberspace at Internet addresses: alizard@tweekco%boo@PacBell.COM (preferred) PacBell.COM!bootweekc o/alizard alizard@gentoo.com VirtualNET 9@5103 WWIVnet/Icenet 9@5077 WWIVLink 9@15050 Fido-Net:alizard@1:161/233.

slower; it's about a megabyte in compressed ZIPfile format. If you are using an anti-viral product not mentioned in this article, look it up in the monthly certification sections in the document. The registration cost is \$35. The VSUM tests are even tested against a larger virus

A product that misses 40% is something you don't want taking up hard drive space.

collection than the NCSA tests, and generally yield lower scores than the NCSA tests do for the same product.

NCSA 4/05 VSUM 3/93

F-Prot 2.08 (Frisk) 99+ % 90.7 %

Scan 103 (McAfee) 99+ % 95.3 %

The majority of commercial products not listed here have performance distinctly inferior to either of the shareware packages, they found from 60% to 98% of viruses in the NCSA test suite.

A product that misses 2% of viruses tested is probably not a problem, unless the virus that crashes your system is part of the 2%. A product that misses 40% is something you don't want taking up hard drive space. The name recognition of a product has *no* bearing on how many viruses it will find under testing.

True, most lower-scoring products will certainly do the job the most common viruses the user is likely to contact. Unfortunately, all it takes is an accident in the right place, such as a disk duplicator at a major software vendor, an upload to an Internet FTP site or an online service to turn a rare virus into a common one.

I personally use F-Prot 2.08, and SCAN 103, on a day-to-day basis I'm more likely to use F-Prot because I prefer a menu driven to a command line interface.

(Just before deadline, I found that there is one commercial product that gives performance levels comparable to the shareware products I am reviewing here—Dr. Solomon's Anti Virus Test Kit, from S&S International has a VSUM rating of 88.4%. While I cannot recommend a product that I've never seen, I do suggest that this product is worth looking into.)

HOW MUCH DOES IT COST?

These are shareware registration fees when distributed via download from BBS or the Internet. Electronic distribution gives you a chance to try before you buy.

F-Prot is free for noncommercial use, or \$1 or less per machine for business/commercial use.

Scan costs \$25 and Clean \$35 for noncommercial use; contact McAfee Associates for information regarding their

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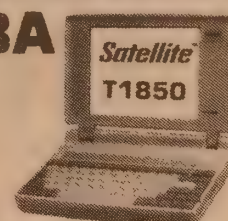
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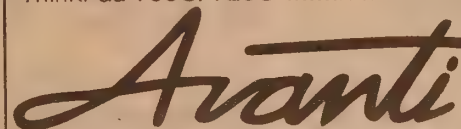
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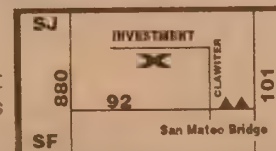


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HOW USER-FRIENDLY IS IT?

I place this question third, as the reviews I've seen for virus scanners tend to be reviews of the user interface, by reviewers who lack independent expertise in the area of viruses. The minimum level of computer knowledge needed to really understand viruses is a knowledge of assembly and machine language, along with a detailed familiarity with the hardware and software architectures of a particular platform. The only way to see how a virus scanner works in practice is to test it as described above.

If a virus scanner misses viruses, it doesn't matter how easy it is to use. Ease of use really isn't a problem even for the most inexperienced DOS user, as these programs default to "scan all the .EXE and COM files hard drive for viruses and Trojans".

F-Prot is menu driven, and can be used in a command-line-driven mode for use in

of viruses found by SCAN. This is due to the fact that unlike F-Prot, Scan and Clean are two separate programs. This, in my opinion, is unnecessary; however, in practical use, if you have so many viruses infecting your hard drive that entering the entire list is a problem, data entry is the least of your worries. There are a number of command line options; I suggest reading the documentation to make the most of them.

PRODUCT FEATURE DIFFERENCES?

Scan/Clean has an integrity checker, which allows a form of tagging which will detect changes to executable files on which the -AV option on scan has been used. While this sounds like an ideal solution, it is not universally applicable, as some programs are self-modifying in the normal course of operation. There's a McAfee product specifically for Windows as well as an OS/2 version.

NETWORK COMPATIBILITY?

Provisions are made for network compatibility in F-Prot and in the standalone version of the McAfee products. A special network fileserver version of the McAfee products is also available.

I haven't run either on a network and can't comment on how well they work.

HOW OFTEN IS IT UPDATED, AND HOW EASY IS IT TO GET THE UPDATES?

F-Prot is updated at approximately two-month intervals; McAfee products are updated every four to six weeks. You can usually get your updates wherever you got your original copy.

WHERE CAN YOU GET IT?

Your nearest computer store should carry, or be able to order, the one commercial product listed; if they say they have products "just as good," inquire closely as to how the products were tested in order to obtain those results. Don't be misled, for instance, by stickers on boxes from a certain well-known manufacturer saying that "This product detects 100% of the viruses in the NCSA library"; this may have been true when the sticker was printed, but is not true now. (I checked.)

Both products reviewed are generally acquired via download, though those of us without modems can mail-order copies of these products from the manufacturer. It is generally a good idea to check downloaded copies for viruses, using whatever you are currently using as a virus scanner. These products also have self-scan capability good enough to catch most hacks.

Scan/Clean is on most hobbyist computer BBS systems; the current version as of this writing is 103. Systems likely to carry it can be found in the BBS section in back of the magazine. Or it can be downloaded from McAfee's BBS; add \$9 for disk handling charges if the program is ordered by mail rather than through electronic distribution.

F-Prot is most easily found on Internet systems, the version as of this writing is v2.08; this product is harder to find on BBS systems though some systems carry it. Or you can mail-order it: the price for a single update ordered from FSI is US\$20; regular, bimonthly updates by mail are available for US\$100 per year.

If you have Internet access via FTP or FTP-by-mail gateway, the latest version is posted by the author in:

141.210.10.117 oak.oakland.edu in /pub/msdos/virus ■

The race between virus creators and anti-virus software manufacturers accounts for this software being so frequently updated.

autoexec.bat files and so on. To run this program in the default mode, simply type FPROT, and when the menu comes up, type B(egin Scan). It can be instructed via menu option to automatically disinfect files as they are found.

Scan is command line driven, but in the default mode described in the quick start guide, SCAN C: really isn't that difficult to type, even for the most dedicated Windows user.

To use Clean, in the event that a virus strikes, you have to manually enter the list

F-Prot has a TSR virus stopper, intended to stop viruses from accessing the system in ways unique to viruses; it should be loaded and run at startup as part of the autoexec.bat file. It also has a heuristic mode that attempts to find viruses not in the system listings by analyzing the operation of the program in a more sophisticated way than the TSR does. It gives more false alarms than the regular scanner, but might be helpful in case there seems to be evidence of viral operation and the signature-based scan finds no virus. A Windows version is planned.

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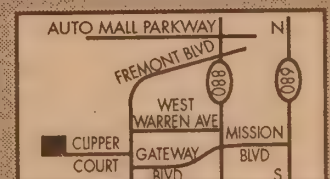
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GOVERNMENT & CORPORATE PO'S WELCOME

Mac Performance Art, TOG On Trashcans, And More

BY DAVID
MORGENSTERN

BMUG is a remarkably democratic institution all told, although there are those that find it an all-out anarchy, while others rail against even the slightest limitation of action. The day-to-day affairs of the BMUG office are overseen by our Executive Director, Steve Costa, and our hard-working staff. But sometimes there are sticky questions that can only be resolved through a consensus of the

onto the show floor. This was a shame, since there were many interesting products on display.

The semantics of the Macintosh world was part of the problem. "Apple" does not mean "Macintosh" to most users. The Apple computer has always meant the Apple II, and mixing up the two names has always been the mark of a Macintosh newbie.

Nowadays, the orphan Apple computer is only of interest to schools that still have old Apple models hanging around, or to the die-hard fans that refuse to buy a Mac. One of these poor dudes ambled up to

the BMUG booth looking for a fight, claiming that his souped-up Apple system can run rings around the Mac. Probably true, but still pathetic. Although there were several handfuls of Apple products and user groups at the show, it was predominantly a Macintosh affair. Sadly, most of the public saw the "Apple" in the advertising, and decided that they'd do better to wait for a real Macintosh Expo.

The best thing at the Apple Expo West was Dream Encoding, a performance piece by a local San Francisco Bay Area artist, Pamela Z. Dream Encoding started with a conservatively dressed young woman giving a marketing demonstration of a new product, Art-O-Matic. "Why bother with practicing?" claimed the presenter. The product promised to bestow instant "art" to the user. "No matter how dull or uninteresting your life has been, Art-O-Matic will bring an instant lifestyle change."

The demonstration featured a series of professional-looking packaged computer and video presentations on several large screen displays. Suddenly the displays were filled with a woman with wild dreadlocked hair, who peered about, and then disappeared. This apparition disturbed the demonstration and the poor

marketing representative's composure. She kept trying to get things back on track, but this strange video character, who looked remarkably similar to the presenter, kept returning, interfering and finally taking over the demonstration. The displays went wild, changing colors, picturing natural scenes and strange effects. The presenter herself was transformed, suddenly singing opera and then merging with the video version of herself. Of course, the video personality and the marketing representative were one and the same person, the singer/performance artist, Pamela Z.

The work, sponsored by Media Tree, a San Francisco video services company, and Zakros Interarts/New Music Theatre, a nonprofit art organization, was very complex in execution, and relied upon many different computer and video technologies. The performance was supported by a crew running several live video cameras, video controllers, MIDI synthesizers, and Macintosh computers. The primary hardware for video display and control were from Fast Electronics, a German company. They have a new line of professional desktop video equipment called the Video Machine.

Pamela was able to adjust some of the music and video effects through a BodySynth controller. The BodySynth, invented by local e-music guru, Ed Severinghaus, translates the wearer's movements into signals that can trigger and control MIDI devices. The device is becoming popular in the high-tech music community, and has been used in performances by Laurie Anderson and Peter Gabriel.

Some onlookers thought that Art-O-Matic was a real product, which flabbergasted Pamela Z. She thought it "totally bogus" when audience members inquired where and when Art-O-Matic would be available to the public. Other viewers maintained there were two different women (credit Pamela's acting ability), and that the nice saleswoman couldn't possibly be Pamela in a wig. The pain and distress of Pamela's marketing persona were certainly familiar to me, after sitting through many years of real-life screwups in

TOG feels that many wrong software design decisions were made because of limitations in the original Macintosh Hardware.

concerned parties. BMUG's baseball team is one of those questions. Should BMUG attend A's or Giants games?

The A's contingent claims that since BMUG is located in Berkeley, we have a natural affinity to the Oakland A's. However, those of us that prefer the National League, point out that the Coliseum and Candlestick Park are geographically equidistant to the BMUG office. There have been some close calls across the table at the après-meeting food debriefings. The compromise solution—to have a BMUG day at each stadium—has not gained acceptance among the warring factions. This debate will continue into extra innings through the summer. Perhaps a meeting at a neutral site—the racetrack!

B M U G



Copyright © 1993 by David Morgenstern. All rights reserved. David Morgenstern believes that computers and BMUG can cultivate a positive change in the world. He volunteers time at BMUG when he's not working his "regular job," writing, or prowling around the BMUG Bulletin Board. He can be reached through the BMUG office, on CIS at 72030,1607, and on Internet at davidm@sfsuvax1.sfsu.edu.

WEST THESE WEARY BONES

There was a serious snafu with the Apple Expo West show, held a couple of months ago in the San Francisco Civic Auditorium—no one came to the party! The show is a transplant from Boston, and the organizers, Event Specialists, predicted that more than 30,000 persons would walk through the doors. Unfortunately, only a quarter of that number found their way

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demonstrations at BMUG meetings.

There were a number of other cool items at the show—here are the highlights:

- Meridrew Enterprises showed their new environmentally correct Klear Screen computer cleaning spray and cloth. Many of the standard cleaning products used in the industry contain ozone-depleting compounds, but the Klear Screen spray is 100% free of these nasties. The Klear Kloth is a very soft polishing cloth that will not scratch screens, or leave dust behind. They're also great for your glasses.

The leading screen and keyboard cleaners often contain alcohol and ammonia, which are flammable and toxic chemicals, and should be used with adequate ventilation. Klear Screen is nontoxic and requires no special handling or warnings. It's also safer for the plastics and display screens we see on today's computer products. Apple now warns users not to use ammonia or alcohol-based cleaners on their new products, since they may react with the plastics.

- I was impressed with the Think for Yourself CD-ROM by the PEMD Education Group. It's a collection of statistics from United Nations, World Health Organization, and other governmental sources, with an easy to use Discovery data analysis program.

The information includes data on AIDS, the environment, health, and American demographics. It must be exciting for students to be asked real questions, and then deal with real data sets to discover answers. It's one thing to read about comparisons of the rate of AIDS between Africa and other countries, and it's another to draw your own conclusions from the same figures used by our leaders. There are so many different ways that this product could be used by students, with or without a statistical background.

Statistics can sometimes intimidate the nonmathematical, or the younger student. The Discovery application makes the analysis process understandable, and lets kids get right into the data with their hands. Statistical mud pies!! The results can be cut and pasted into a report, or the application can dump the results into HyperCard-based lesson modules. There are different prices for students, teachers, and classrooms, ranging from \$50 to \$150.

TRASH TALK

A while ago, I covered some of the changes to the Macintosh Human Interface Guidelines. I happened to get a response from Bruce Tognazzini (known as TOG), a former Apple interface designer who now works at Sun. He sent me a chapter from his forthcoming interface book that describes some shortcomings of the Macintosh interface.

TOG feels that many wrong software design decisions were made because of limitations in the original Macintosh hardware. System software engineers and application programmers have been carefully following these limitations over the years, even though current Macs are nothing like the original. He feels that these original flaws have seriously compromised the functionality of resulting systems.

The primal Macintosh was intended to be an information appliance for the home, a toaster-sized, small screen noncolor computer, with a single, single-sided, floppy disk drive. No hard disks, no memory add-ons, and no opening the box. The theory promoted by Saint Steve Jobs was that the sealed standard box would relieve software developers of the need to continually upgrade their products. TOG says that this decision didn't even last until the Macintosh was released, but endured long enough to force a number of fundamental design decisions that resonate in today's interface, and in other graphic user interfaces influenced by the Mac.

TOG runs on about many "serious" shortcomings of the Mac. Here is his complaint on Trash Can restrictions:

"At the Admiral's Club at the San Jose International Airport, they have a square hole cut through the surface of the coffee counter with a trash can perched beneath. In front of the hole is a brass plate with the words 'trash dispenser' etched deep into its surface. Presumably the membership are invited to take with them just as much trash as they please, and at no cost.

"Macintosh and other windowing system users are invited to put as much trash as they please into the trash can, just as long as that trash is already lying about the desktop, rather than being within an application window. In most cases, it is quite impossible to drag an object from inside an application across the desktop and drop it in the trash. Why? Because that's the way those young geniuses at Apple did it.

"The original Macintosh was so small that there was not enough room for the application and the desktop (in the form of the Finder) to be inside the computer at the same time. Therefore, there was no possibility of anyone dragging something from an application to the trash because the trash was not there at the time. Yet another limitation faithfully reproduced."

If you're interested in the Mac interface as a

subject, I recommend TOG's last book, *TOG on Interface*, which was published last year by Addison-Wesley. It's still available in many computer bookstores.

TIP THE LITE FANTASTIC

- EndNote Plus is one of BMUG's Choice Products for students and teachers. It now comes with a special Plug-In Module for use within Microsoft Word 5 or 5.1. This allows you to format your citations in real time, rather than using the EndNote application to process your document. But there are a number of important things to remember.

Use either the Module or the application, not both. So if you use the Module in a document, don't also insert a couple of citations with the application. The Module actually creates special graphics in the Word file, while the EndNote program's citations are regular text.

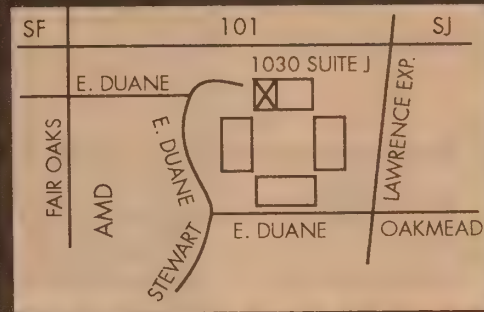
If you are using the Plug-In Module, never open the document in an earlier version of Word! Each graphic marker contains information about its particular citation. If you open the document with an earlier version of Word, this information will be completely destroyed. Totally. You will have to reenter all the citations again. Please check on the version of Word that might be on your friend or laser parlor's hard drive before you double click on your file!

- Here's a tiny Trash tip. Beginners often make the mistake of choosing the Eject disk...selection from the Special menu in the Finder to eject a disk. Although this seems like the proper thing to do, it often leads to problems. Your Mac might ask again to see the disk you handed a coworker heading to the airport.

If you want to eject a disk and take it away with you, use the Put Away command (Command + y), or drag the disk icon to the Trash Can. If you want to eject a disk in order to copy something from one floppy to another, use the Eject disk...selection (Command + e). Does it make sense? No. Work? Trust us.

- The flea markets and swap meets are filled with old Mac Plus and SE models, but the proud owners of these "bargains" suddenly discover that up-to-date versions of software sometimes won't work on these orphan computers. No one has a clue as to what's good or bad. BMUG to the rescue! We have back issues of the incredible BMUG Newsletter available from past years. The Fall '89, Spring and Fall '90 are filled with useful articles, and cost only \$5 (there's an additional charge for postage and handling) from the BMUG office. Call (510) 549-2684 or fax (510) 849-9026. ■

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The BMUG Office, 2055 Center Street (a half block from the BART Station) is open to the public from 9 am to 5 pm. Please come by and say hello, meet other members, and hang out.

The BMUG Helpline provides volunteer technical assistance and telephonic hand-holding for our members. If your question can't be answered on the spot, we try get you in touch with someone that can help. Of course, not every problem can have a happy ending—but we try. Improve your Macintosh education, and help others by becoming a Helpline volunteer!

BMUG has one of the most up-to-date, comprehensive software libraries around with hundreds of disks filled with the latest versions of public domain or shareware programs, and HyperCard stacks. New disks are unveiled almost every week at the Thursday general meeting. BMUG also brings you the TV-ROM™, a fantastic collection of public domain QuickTime videos.

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BMUG can be found on most electronic services. BMUG can also be reached through the Internet international network through UG0001@applelink.apple.com.

To get some further information about BMUG please write to: BMUG, 1442A Walnut Street #62, Berkeley, CA 94709. If you prefer to phone our business office call (510) 549-BMUG, or FAX (510) 849-9026.

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direction to users and developers in the computer community worldwide. It is an independent advocate, not affiliated with any manufacturer, delivering trustworthy information and useful products.

Like any growing organization, it is many different things to its 14,000 international members. BMUG supports many Special Interest Groups (SIGs), an 18-line Bulletin Board System (BBS), free HelpLine, software library, weekly meetings, publications, and much more. BMUG also puts out a semi-annual 350+ page book that we call our "newsletter."

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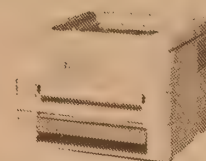
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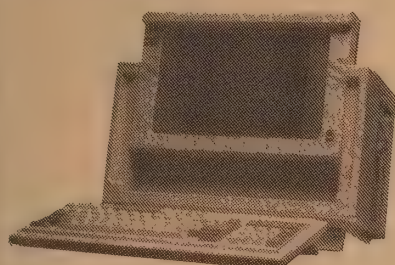
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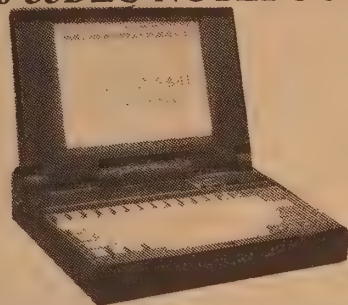
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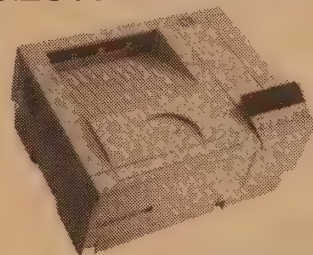
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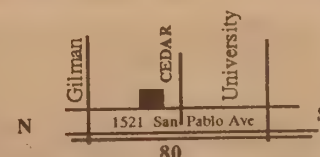
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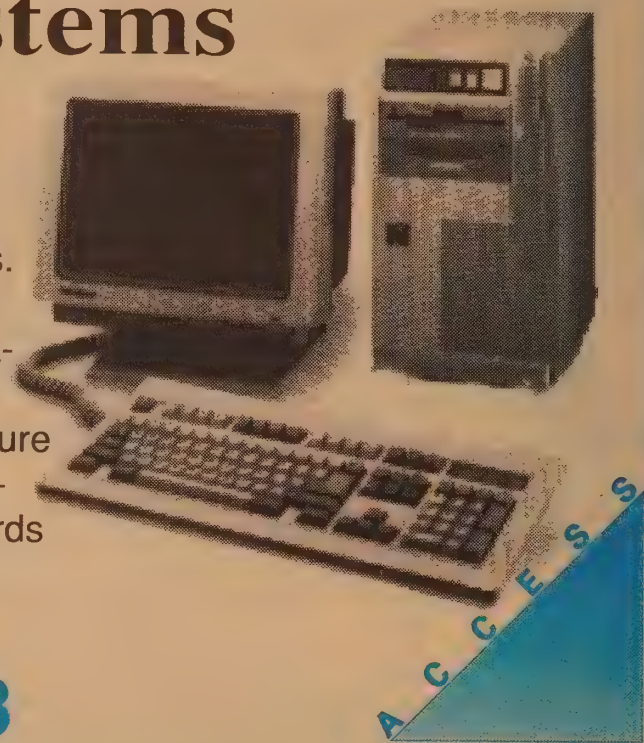
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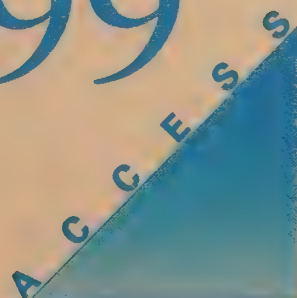
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Equity 386SX-16Plus

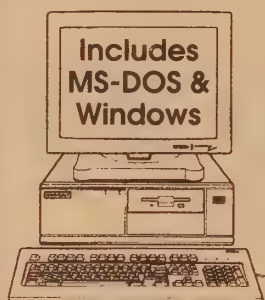
- 16MHz 386SX
- 2MB RAM exp. to 14MB
- 60MB Hard Drive
- 101 key keyboard
- 12" Mono VGA Monitor
- 3.5" floppy drive
- Integrated SVGA card
- One-year onsite warranty

*Certain Restrictions Apply

\$488

Equity 4 Systems **NEW!**

Affordable High Performance!



- Support for Intel's OverDrive
- 4MB RAM exp. to 32MB
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- 101 key keyboard & mouse

486DX-33 w/o HDD **\$1050**

486DX-33 240MB HDD **1399**

*Monitor not included

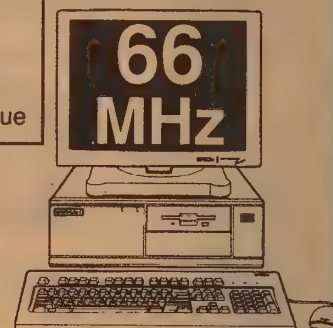
PROGRESSION 486DX2/66 **Born to Run Windows... The Fastest in its Class!**

- Intel 486DX2/66 processor
- Built-in 8KB cache
- Built-in math coprocessor
- 4MB RAM exp. to 36MB
- Epson's VirtualCache™
- 6 8-bit I/O slots
- 3.5" 1.44MB FDD
- MS-DOS, Win. included
- Wingine™ graphics acceleration architecture
- Integrated serial, parallel, mouse & VGA ports

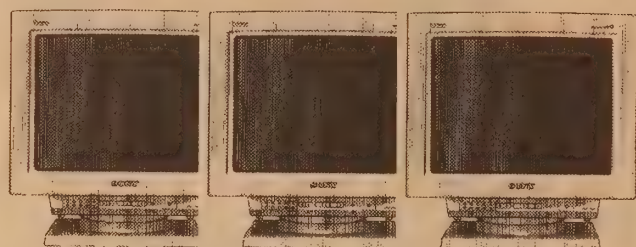
EPSON PROGRESSION
wins "hands down" when
compared to:
• Compaq • NEC • DELL
PC Magazine Jan. 26, 93 issue

\$1999

*Monitor not included



SONY



Trinitron Digital Control Color Monitor

CPD-1730

\$999

- 17" Super Fine Pitch™ Multiscan Trinitron color display
- .25mm aperture Grille pitch, 1024 x 768 at 72Hz Non-interlaced
- Variable scan frequency of 28 to 58 kHz
- Overscanning for crisp edge-to-edge images
- Sony Display Memory System
- Full compliance with Swedish MPR II standards

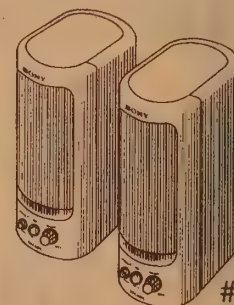
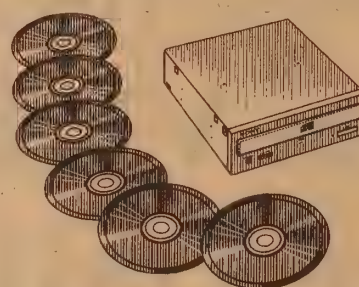
CPD-1320 14" 640 x 480 .25mm **\$339**

CPD-1430 14" 1024x768 .25mm **599**

GDM-2036 20" 1024x768 .30mm **1999**

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ScanPlus GS Desk Scanner PMP300	299
Video 7 Win. VGA Card ADN216	119
Bellsouth Big Button Phone PHB176	29 ⁹⁵
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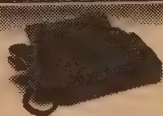
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Flip Palm Phone EB-H60	549

UNIDEN:

CP6000 Handheld	179
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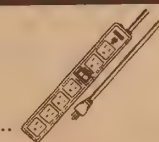
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Magnavox CDD461	\$129
Sony CD-Laser Library HDS7205	399
Thunder & Lightning Card ADS202	198
I/F for CD-ROM Drive HDS7205i	69

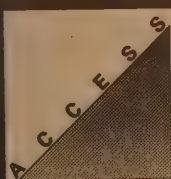
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Teak 5 1/4" Disk Cabinet w/lock XFD70	9 ⁹⁹
Teak Video Cassette Holder XVCR	9 ⁹⁹
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Silicon Sports Mouse Pad PMS112	3 ⁹⁹
Silicon Sports Keyboard Pad PMS120	4 ⁹⁹
Silicon Sports Notebook Pad PMS122	14 ⁹⁹



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DX50MHz 269
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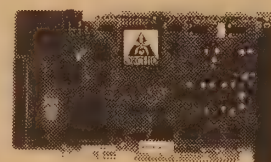
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• includes Orchid Voice Notes and microphone

Fahrenheit ISA VA 1MB \$199

Fahrenheit VLB VA 1MB 209



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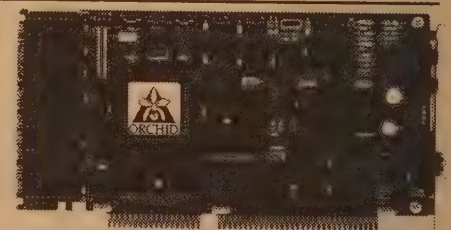
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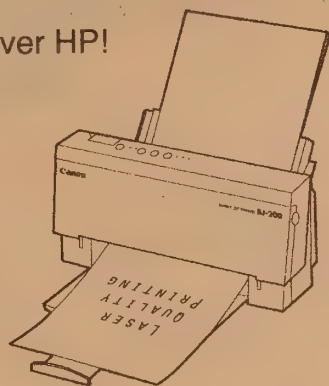
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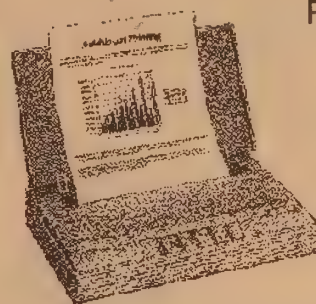
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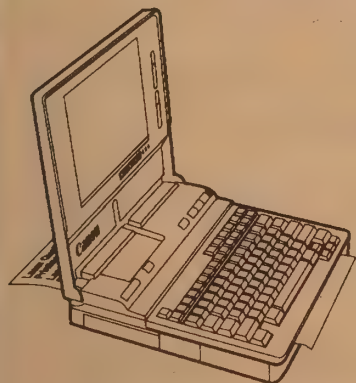
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Entire system w/
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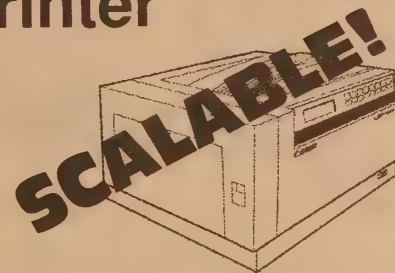
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- Preloaded DOS, Windows & NoteJet tutorial, and more...

LBP-4sx **Laser Beam Printer**

*Same as HP IIIp for
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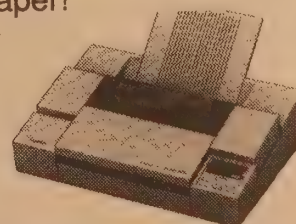
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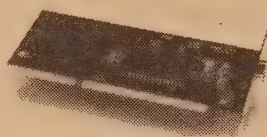
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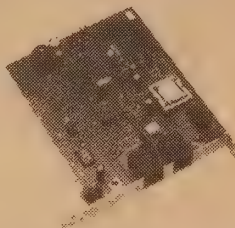
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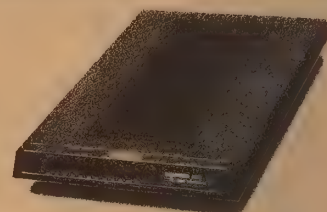
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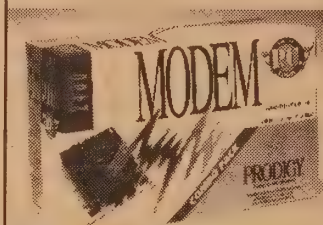
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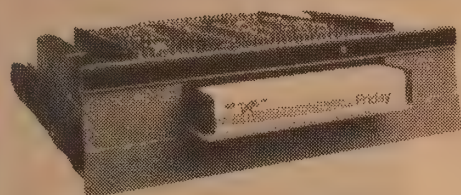
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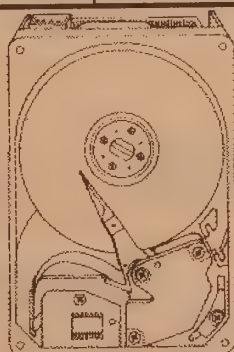
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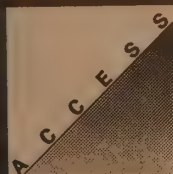
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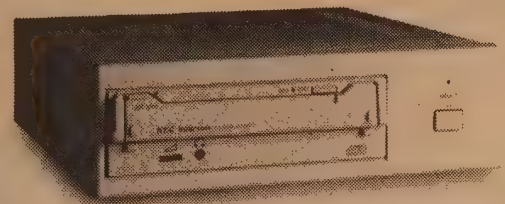
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CPUs

1MB x 9 60ns	\$36
1MB x 9 70ns 3 chip	34
1MB x 9 70ns 9 chip	39
256K x 9 70ns	14
4MB x 9 60ns	155
4MB x 9 70ns	149

intel

Instant acceleration for your power applications.

80387SX	\$88
80387DX	88
80387SL	88

intel

High Quality Chips!

486DX2-50	\$399
486DX2-66	509
486-33	299
486-50	439

JOY STICKS

CASES

I/O & IDE CARDS



by BONDWELL

AVIATOR

\$26⁹⁹



INTRUDER
\$19⁹⁹

Baby Desktop 200W	\$75
Full Desktop 285W	99
Mini Tower 200W	69
Medium Tower 200W	85
Full Tower 220W	109
Super Tower 300W	119

AT I/O 2S/1P/1G	\$19
IDE Controller	19
IDE w/ 2S/1P/1G	29
VLB IDE w/ 2S/1P/1G	69

ETHERNET CARDS

UPS

SCSI CONTROLLER

EtherLink III

Parallel Tasking Network Adapter
by 3COM

- Featuring 3Com's New Parallel Tasking Architecture
- Remote Manageability with LinkWatch SNMP software
- Lifetime Warranty

16-bit coaxial cable	\$139
10BASE-T	139

Prevent Lost Data...

With an Uninterrupted Power System

550VA standby w/Novell adapter ...	\$299
300VA Model 20	349
1250VA w/ Indicator	699

The SCSI Master

Adaptec ISA-to-SCSI High-performance
Bus Master Host Adapter Kit



\$289

- Features the AHA-1542 SCSI host adapter
- Includes SCSIselect configuration firmware utility
- Provides support for HDD, removable, MO & CD-ROM SCSI peripherals
- Includes Adaptec's I/O operating environment support for DOS, Windows, OS/2, Network and UNIX.

MOTHERBOARDS

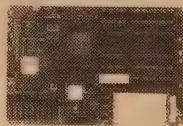
ALARIS 486SLC2 50MHz
VESA Standard Local Bus!

Includes **\$329**
CPU!

Alaris SLC2 Board Features:

- 486SLC2 processor w/ 16KB internal cache
- 0K exp. to 16MB RAM on-board
- 64KB External RAM cache exp. to 128KB
- 2 VESA Local-Bus slots
- 7 16-bit & 1 8-bit ISA slots
- Mini-AT footprint • 3 year warranty

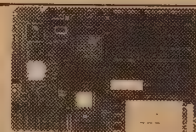
Manufactured
In USA by IBM



GENOA 486
VESA Standard Local Bus!

\$249

- 256K cache
- 0K exp. to 32MB RAM on-board
- Pentium Chip socket
- 2 VESA Local-Bus slots
- 4 16-bit & 2 8-bit ISA slots
- Mini-AT footprint • 2 year warranty
- CPU not included!



SILICON STAR 486
VESA Standard Local Bus!

CHOOSE YOUR SPEED
33,50, or 66MHz... by Jumper!

\$169

- 256K cache
- 0K exp. to 32MB RAM on-board
- 2 VESA Local-Bus slots
- 5 16-bit ISA slots
- Mini-AT footprint • 1 year warranty
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SPECIAL BUYS!

SUPER VALUE DEALS!

**Come See What Everyone's Talking About!
Panasonic Telecommunications.**



**PANASONIC
PRESENTS THE
30-CHANNEL
WIRELESS PHONE.
IT CLEARLY OUTDISTANCES
ORDINARY
CORDLESS PHONES.**

Panasonic presents the KX-T9000. Advanced 900 MHz technology offers a new dimension in cordless communication - incredibly clear sound at longer distances.

This Panasonic wireless phone operates on 900 MHz, an ultra high frequency band recently approved by the FCC. So it doesn't have to share radio channels with ordinary 46/49 MHz cordless phones and other radio-controlled devices, such as garage door openers and baby monitors. The result-our phone delivers amazingly clear sound over an extended range.

The Panasonic KX-T9000 has 30-channel automatic scanning to find the clearest channel as soon as you open the folding portable handset.

And our wireless phone is also the only 900 MHz cordless phone with Sound Charger™ technology. It's a sophisticated noise reduction system that uses compression and expansion technology to simultaneously filter out background noise while amplifying the caller's voice.

So if you want a phone with sophisticated technology that's light years ahead, get the new Panasonic wireless. It's bringing communications technology to a higher level.



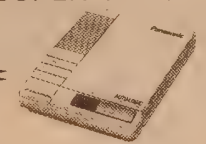
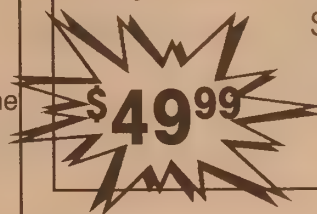
\$349

Panasonic

KX-T1450 Panasonic Auto-Logic™ Answering Machine

- One-touch Playback • Extended OGM
- Dual Standard Cassettes • 12-function Tone Remote
- Message Memo Recording • Selectable Recording Times

SUPER VALUE!



KX-T2720 Panasonic Intergrated Telephone System

- Built-in Answering Machine
- Voice Time/Day Stamp
- Voice Menu
- One-Touch Playback
- User-Programmable Security Codes
- 2-Way/Memo Recording
- And Much More...

TELEPHONE/
ANSWERING MACHINE
ALL-IN-ONE!



\$149

KX-T3980 Panasonic 2-Line 10-Channel Cordless

- 2-Line Operation
- Auto Line Selection
- Auto Scanning System
- Hands-Free Speakerphone
- Auto Security System
- And Much More...

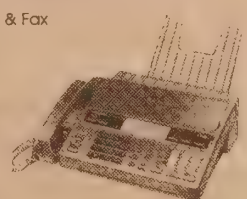
PERFECT FOR THE
HOME OFFICE!



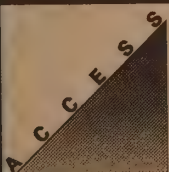
\$159

KX-F230 Panasonic Fax Machine/Answering System PAPER CURL REDUCTION TECHNOLOGY!

- Intergrated Telephone & Fax
- Auto Paper Cutter
- Auto Call Switching
- Single Line Operation
- Extension Line Transfer
- And Much More...



\$469



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COMPUTER TECHNOLOGIES

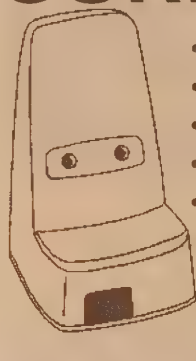
2225 EL CAMINO REAL SANTA CLARA, CA 95050

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A HUGE SELECTION OF

Sales & Service Open 7 Days a Week!

CORDLESS MOUSE



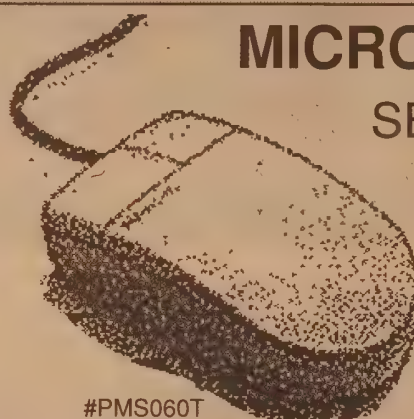
- Cordless super mouse by Z-NIX
- Receiver/charging stand
- Mouse drivers
- Two rechargable batteries
- And more...

\$39

MICROSOFT MOUSE

SERIAL VERSION

True Microsoft Quality!



#PMS060T

\$49



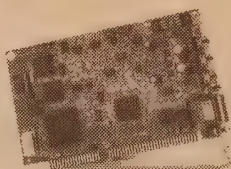
SoundMan™ 16

16-Bit CD-Quality Sound Card

BONUS:

FREE Game from Accolade w/ purchase*!

- 16-bit stereo playback & recording
- Sampling/playback rate 2KHz-44KHz
- Yamaha OPL-3 stereo synthesis chip w/ 4 operators generating 20 voices
- Stereo amplifier output at 4 watts channel
- And more...



\$139



#ADS117

*Certain restrictions apply. Valid thru 8/31/93.

ETERNAScan

HANDHELD COLOR SCANNER

\$269



#PME200C

- Real-time display • 100-400 dpi resolution
- Color, B/W, dithered color, & gray scale modes
- TIF, PCX, MSP, CUT, IMG formats
- Includes EZImage software, Photo for Windows & development tool kit

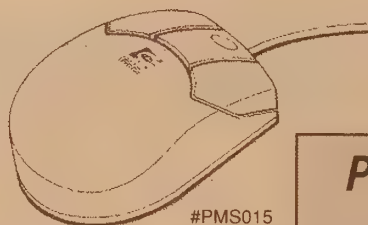


MouseMan™

High Resolution Serial PS/2 Mouse

Don't be caught with a dying mouse!

- 400dpi resolution
- Three programmable button flexibility
- New ergonomic design
- Enhanced MouseWare™ Utilities
- Windows™ 3.1 compatible
- IBM PC, XT, AT, PS/1, PS/2 compatible



#PMS015

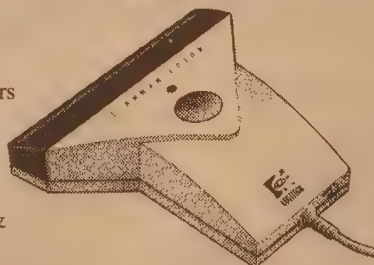
ScanMan™

Hand-Held Color Scanner

Add the Impact of Color!



- 24-bit hardware, captures 16.8 million colors
- Virtual page scanning-auto stitch, multiple scans together
- Total system calibration-color matching
- Saves images in TIFF, BMP, PCX, JPEG & EPS formats
- Supports Windows™ (OLE) & TWAIN protocols



#PMS254

Prices too Low to Advertise! Call Us!

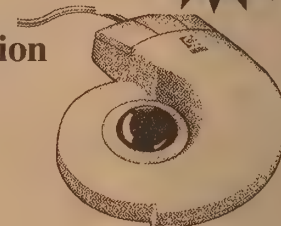
TrackMan™

High Precision Stationary Mouse

Designed for Comfort and Precision



- Three programmable button flexibility
- New ergonomic design
- Enhanced MouseWare™ Utilities
- Guaranteed to work with all Windows™ and DOS applications



#PML100S

TrackMan™

Portable Mouse



See and feel the difference

- Small, lightweight and portable, three-button support
- Made to travel, includes sturdy casing & padded case
- Right or left hand w/ re-routable cable
- One piece simple spring clamp installation
- LogiPanel programming buttons in Windows
- Limited lifetime warranty



#PML100P

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MONITORS & CARDS!

Name Brands...At Low Low Prices!

Panasonic
Office Automation **OA**

14" C1381i SVGA Monitor



IBM & MAC
compatible!

\$329

- Up to 1024x768
- Horizontal scan rate 30-37 KHz
- Vertical scan rate 50-90Hz
- .28mm dot pitch
- Tinted, Non-glare Black Matrix screen

1395 14" 1024 x 768 ... **\$439**

1795E 17" 1280 x 1024 **1199**

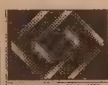
1991 20" 1280 x 1024 **1499**

GRAPHIC CARDS



ATI Ultraplus 1MB **\$299**

ATI Ultrapro 2MB **429**



Stealth 24 VLB 1MB **\$249**

Viper VLB 2MB **429**



8500 VLB 1MB **\$189**



VColor 1MB SVGA **\$95**

VColor XL 1MB **109**

TOSHIBA

17" SVGA Monitor

High Resolution Flat Square!

MAC Compatible!

**SUPER
VALUE!**



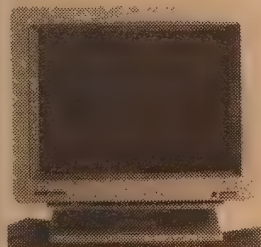
\$599

P17CU01

- 1024 x 768, .31mm dot pitch
- Scanning frequency up to 57KHz
- Auto mode selection (9 preset/9 manual)
- Corner screen legibility w/ FS color tube

IMPRESSION™

14" SVGA Monitor



**SUPER
VALUE!**

\$329

IM1448M

**Save Hundreds of
Dollars Compared
to Other Monitors!**

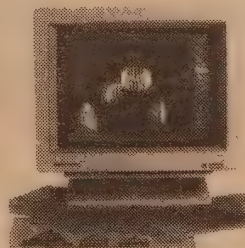
- Up to 1024X768, .28 mm dot pitch
- Non-Interlaced

IM1439SV 1024 .39.. \$229

IM1428SV 1024 .28 ... 289

CORNERSTONE™

17" SVGA Monitor



\$1150

**Identical
to NEC 5FG for
\$200 Less!**

- Up to 1280x1024, .28 mm dot pitch
- 27-79 kHz scan frequency
- Analog RGB input

ViewSonic™ 17

17" SVGA Monitor



NEW!

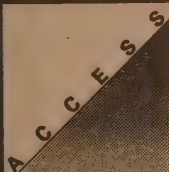
\$1250

ViewMatch™ Color Control

- Up to 1280x1024, 76Hz refresh
- .28mm dot pitch
- 30-82 kHz scan frequency
- Analog RGB input

15" 1280 x 1024 \$688

20" 1600 x 1280 1950



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The Intelligent Choice..

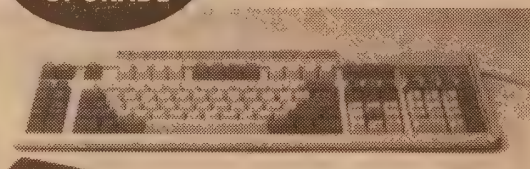
Serving the Community Since 1987!

Maxi Switch

ProKEY 124 is more than just a keyboard...it's a personal productivity enhancement tool.

**PC WORLD
TOP 20
UPGRADE**

3 YEAR WARRANTY!



\$95

101Enhanced Keyboard . \$29

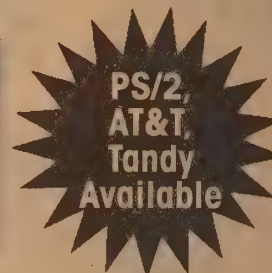
101 Keytronic keyboard...49

Focus 8000/9001 59/89

Fujitsu 4700 keyboard 59



**NORTHGATE
COMPUTER
SYSTEMS, INC.**



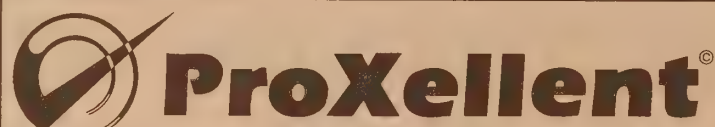
OmniKey™ Keyboards

101S / 101NI \$59/79

102 79

UltraT / UltraF 99

Skin Protectors 19⁹⁵ each



**Only ProXellent Programmable Keyboards
Give You ON-SCREEN Reprogramming.**

**NEW
WINDOWS
Version!**



\$99
(white only)

- ProXellent's PK-1 application software on a 5.25" floppy.
- Original Alps click/tactile mechanical keys for superior feel.
- Removable software templates featuring Word Perfect, Lotus 1-2-3, Dbase IV, MS-Word & one blank template

AC-LINE CONDITIONER

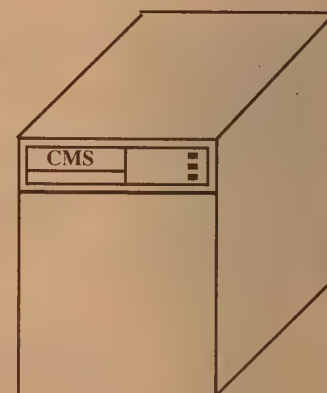
by **CMS**

Authorized Dealer

***Provides a clean
steady power level!***

***Eliminates
surges & spikes!***

***Built-in
surge protection!***



UC Listed • FCC Approved

300 VA	\$49	1000 VA	\$169
500 VA	89	3000 VA	229

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ACCESS COMPUTER!

...Personal Service, Value & Pricing!

CITIZEN™

The Best In The Business.
Featuring Color On Command™

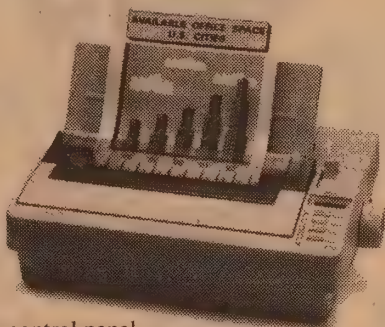
\$169

GSX-130

- 24-pin printer • 180cps, 60cps LQ
- 5 built-in fonts • Fontlocking feature
- Paper parking • Features Command-Vue II™ control panel
- Optional Color On Command™ • 2 year limited warranty

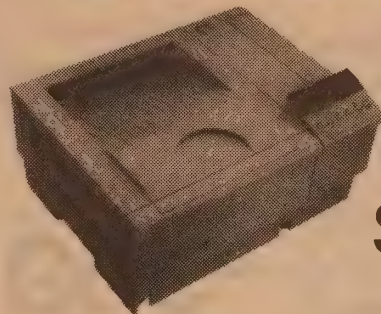
Color On Command Option: **\$49**

GSX-140 plus 24-pin 220cps, 6 fonts	\$269
GSX-230 24-pin 270cps, 8 fonts	259
GSX-240 24-pin 300cps, 13 fonts	309



NEC

Get The Perfect
Deal On
The Laser Printer
That's A "Perfect 10"
MAC Compatible!



Silentwriter®
95f



POSTSCRIPT™

- 6 PPM, 2MB RAM exp. to 5MB
- 35 scalable Adobe fonts
- 14 bitmap & 8 scalable HP fonts
- HP LaserJet III w/PCL-5 emulation
- Auto Interface Monitoring for easy sharing

\$949*

*After Rebate

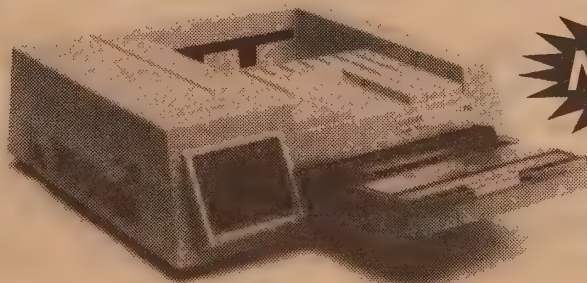
Silentwriter is a registered trademark of NEC Technologies, Inc.

OKIDATA®

LED Page Printers



OL400.
PC Magazine®
Editors' Choice.



OL810.
With OKI

Smoothing Technology™
PCL-5 Scalable Fonts

- Industry's best warranty: 5 years on printhead, 1 year parts/labor on printer
- PC Magazine Editors' Choice- June 12, 1990
- 4ppm, 300dpi: crisp blacks, publication quality output
- More standard typefaces/fonts than LaserJet™ IIP
- High-capacity 200-sheet paper tray included
- HP® Series II compatible
- Design fits any desktop

\$529*

IN-STORE PRICE \$579

*Price reflects a \$50 end-user mail-in rebate, some restrictions apply, valid thru July 31, 1993.

- Industry's best warranty: 5 years on printhead, 1 year parts/labor on printer
- OKI Smoothing Technology™ for 1200dpi appearance
- 8ppm, 300dpi: crisp blacks, publication quality output
- 1 MB RAM exp. to 5MB, 13 HP III scalable fonts
- High-capacity 200-sheet paper tray included
- HP® Series III compatible
- Optional RS-232 Serial interface

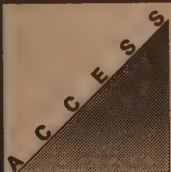
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9-PIN

- **ML-320/321** 300cps \$319 /459
- **ML-520/521** NEW! auto form sensing CALL
- **ML-3410** Fast 550cps! 8-part forms . 1299

24-PIN

- **ML-380** 192cps, 63cps 229
- **ML-590/591** auto form sensing 469/599
- **ML-395** Fast 607cps 5-PART FORMS 999



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A HUGE SELECTION

Thousands of Printers in Stock!

EPSON®

WHEN YOU'VE GOT AN EPSON,
YOU'VE GOT A LOT OF COMPANY™

Great Features Such as:

- Scalable Fonts
- Printer Sharing
- And More...

LQ-570+  LQ-1070

NEW!
Faster w/
more fonts!

\$239



\$359

- 24-pin, 337cps
- 14 built-in fonts
- 2 year warranty

FREE*
Letter Quality
Film Ribbon
w/ purchase!

*Offer valid on LQ-570+ thru Dec. 31, 1993

- 24-pin, 315cps
- **WIDE Carriage**
- 2 year warranty

DOT MATRIX	
LQ-870	\$469
LQ-1170	599
LQ-2550 400cps	899

LX-810 9-pin 80 column 169

FX-870/1170 **NEW** 279/359

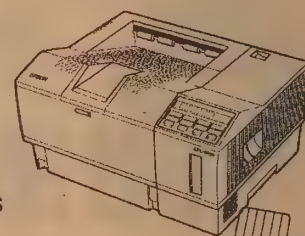
DFX-5000 9-pin 530cps 1299

EPL-8000

**TWICE AS FAST AS
HP IIIP (4ppm) FOR LESS!**

\$899

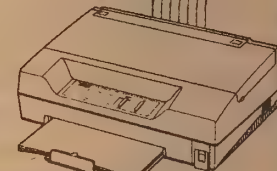
- 10ppm
- 1MB RAM exp. to 7.5MB
- PCL-5, 13 scalable fonts
- Includes RiTech for crisp, sharp images
- Built-in printer sharing
- 2-year warranty



ActionPrinter AP-3250 24-Pin

\$179

**Ideal for home use!
Easy Operation**



- Innovative, space-saving case design • Operates flat or upright
- 50-sheet 8 1/2" x 11" paper tray • scalable fonts
- Simple two-button control panel • Quiet operation
- 2-year limited warranty

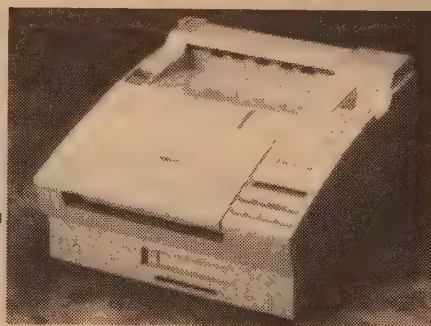
AP-2250 9-pin version \$129



ActionLaser 1000

\$629

- 6ppm
- 512K Ram exp. to 6.5MB
- 14 standard fonts
- 1 cartridge slot
- 150-sheet universal tray
- HP IIP, PCL-4 emulation
- 2 year warranty



ActionLaser 1500

Scalable!

\$688

- 6ppm • 1MB Ram exp. to 5MB
- 14 resident, 13 scalable fonts • 1 cartridge slot
- 150-sheet universal tray • HP III/IIIsi, PCL-5 emulation
- 2 year warranty

EPSON®

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YOU'VE GOT A LOT OF COMPANY™



STYLUS 800 INK JET PRINTER

The look of laser printing
at an affordable price.

**Replacement
Ink Cartridge**

PTE800C

\$19⁹⁵

\$329

- Fast 150cps • Crisp 360 dpi laser quality
- 7 typefaces w/ 4 scalable fonts • Quiet 45dBA
- Compact footprint • 100-sheet plain paper tray
- Prints envelopes with ease • 2 year warranty



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OF PRINTERS!!!

An Authorized PANASONIC Reseller & Service Center!

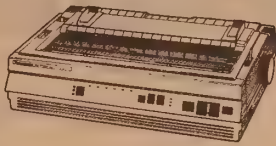
PRINTER RIBBON
by PANASONIC
KX-P115
\$5.99
For: KX-P1180/
1191/1695/2150

Panasonic
Office Automation 

SAVE up to \$150

2-YEAR WARRANTY

KX-P1123
\$169



KX-P1624
\$249

- 24-pin
- 240cps, 63cps LQ
- 7 built-in fonts
- 2 year warranty

- 24-pin
- 192cps, 63cps LQ
- 7 built-in fonts
- 2 year warranty

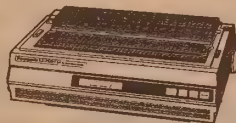
KX-P1124i	24-pin, 300cps, 8 built-in fonts	\$199
KX-P2123	24-pin, 240cps, color capable	199
KX-P2624	24-pin, 300cps, quiet series	299

*THESE ARE FACTORY REMANUFACTURED & FULLY GUARANTEED

**It doesn't Scream, ...
it whispers.**

Panasonic
Office Automation 

The QUIET Series Printers
Come Hear the Difference! 43.5 dBA!



NEW!

KX-P2023

- 24-pin matrix, Non-color
- 240cps, 80cps LQ
- 7 fonts, (43.5 dBA)
- 2 year warranty

\$199

KX-P2123

- 24-pin letter quality
- 240cps, 64cps LQ
- 6 fonts, paper parking
- 2 year warranty

\$238

KX-P2124

- 24-pin letter quality
- 320cps, 85cps LQ
- 8 fonts, 360x360
- 2 year warranty

\$319

KX-P2180

- 9-pin matrix
- 192cps, 38cps NLQ
- 6NLQ fonts, (45 dBA)
- 2 year warranty

\$164

2100 Series
Color Option

Available
\$49.95

KX-P2624

- 24-pin letter quality
- 300cps, 100cps LQ
- 11 fonts, 26K buffer
- 2 year warranty

\$378

MATRIX

KX-P1124i	24-pin, 300cps, 8 fonts	\$269
KX-P1695	9-pin, 330cps wide carriage	379
KX-P1624	24-pin, wide carriage	348



**HEWLETT
PACKARD**

DeskJet 500

\$399

DeskJet 500 Color

499

DeskJet 550C

709

IIIP

4ppm, PCL-5

869

4L

NEW!

699

4

8ppm, 600dpi, PCL-5

1369

4M

6ppm PostScript MAC/IBM

1899

4Si

17ppm, auto interface switch

NEW!

3299

Toner Cartridges

II/III

IIP

\$49*

\$79

PXA201
*remanufactured

PTA208

1369

COLOR PRINTERS

PaintJet

699

PaintJet XL300

2299

SCANNERS

ScanJet IIP with interface

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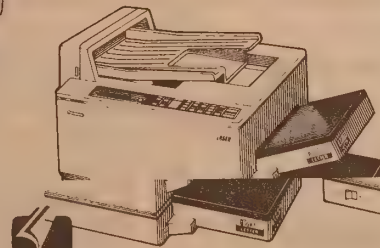
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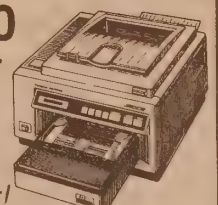
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What We've Learned From Videotext

Lots Of Potential, Lots Of Mistakes

BY KEVIN SAVETZ

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Copyright ©1993 by Kevin M. Savetz. All rights reserved. Kevin is a freelance writer living in Arcata, California with his fiancée Peace, his cat Kinsey, and his Mac IIsi Tofu. They can be reached via email at "savetz@rahul.net".

Since the 1970s, videotext has been heralded as the medium that would change the world. Pundits prophesied that in a few years, videotext would allow the masses to shop and bank from home, and have every conceivable bit of information electronically at their fingertips.

With the benefit of hindsight, we know that videotext didn't quite turn out as expected. Most people don't shop, work, or pay their bills from home. (And a lot of us can't even program our VCRs.) So, what went wrong with videotext?

In 1992, subscribers to all US online services topped 3.3 million, up 24% from 1991. Despite the rapid growth, only a small portion of Americans actually use online services.

WHAT IS VIDEOTEXT?

Loosely defined, "videotext" refers to a two-way link, using a computer terminal, to communicate with an information service via telephone lines.

A more strict definition calls videotext a medium, aimed at the mass market, using computer and telecommunications technologies to deliver interactive services for personal use in the home, office, or public locations.

Although services such as Prodigy and CompuServe are clearly videotext, do private bulletin board systems (BBSes) and electronic databases, such as DIALOG and Nexis, fall under the term? Although some take the view that videotext services include any system delivering electronic information to a screen, the consensus is that a service is videotext if it is aimed at the mass market (rather than, for example, only students or professionals) and is primarily entertainment-oriented. A medical

database, for instance, is not entertaining, nor is it used by the general public—it's not videotext. Neither is a private BBS that supports only one user at a time, or a credit reporting service.

Under this definition, text-based services like CompuServe and Delphi, and graphics-oriented services, like Prodigy and America Online, are videotext.

Videotext differs from most other mass media in one key manner: it is interactive. It allows users to structure their information to fit their needs—this is impossible using television and print media. Also, videotext is not a passive medium—unlike television, which can be watched or ignored, videotext requires the user's undivided attention.

PROBLEMS WITH VIDEOTEXT

Videotext providers have, in the past, been quick to make assumptions about the market. Marketing reports for the early '80s were rife with claims that the public would clamor for information delivered electronically. The public didn't, but videotext providers learned from their mistakes.

Newspaper chain Knight-Ridder launched a teletext service called Viewtron in the early 1980s. The graphical system was slow, the information was sparse, and subscribers needed special terminals that cost hundreds of dollars. Knight-Ridder wanted to provide the "McDonald's of videotext" to upscale consumers, not realizing that the upscale do not dine on fast food. Knight-Ridder did not understand the market. Viewtron was taken offline in 1982.

Here are some reasons for failure and the major lessons learned from videotext failures:

- Videotext services cannot provide only information that is available through other

media. Newspapers, magazines and radio and television news are quick, inexpensive, and can be used anywhere. For this sort of information, consumers are unwilling to exert the extra effort necessary to get their information online.

- Consumers do not consider videotext a necessity. They pay for videotext with disposable income—so they expect videotext to entertain them. A system that is not primarily for entertainment probably will not hold the public's attention. Entertainment functions include online chat systems, public bulletin boards, and multi-player games. The interactivity intrinsic to videotext must be fully utilized.

- Depending on the service, the use of videotext ties up the computer, telephone, or television.

- As noted earlier, videotext requires the user's undivided attention. It requires concentration and interaction, which consumers are not used to in a medium.

- Finally, many videotext systems are perceived to be too slow. The lag time between requesting information and receiving it can be as much as half a minute on systems that must send complicated graphics on a slow phone link. Complex systems with a steep learning curve are also a problem. Users want information quickly, and will become frustrated trying to learn complex commands.

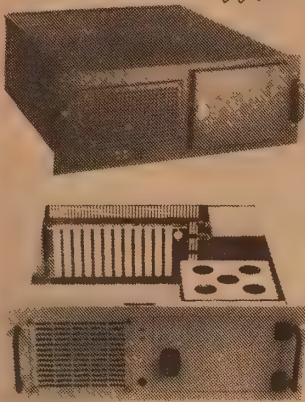
VIDEOTEXT SUCCESS

Videotext has its benefits, however, and has proven successful in the United States and elsewhere.

The classic venture to put videotext in every US household is Prodigy, a joint venture of IBM and Sears Roebuck. Introduced in 1988, Prodigy runs on personal computers with standard modems. Prodigy has yet

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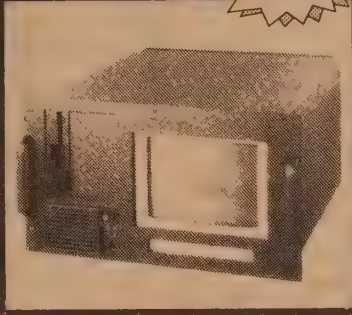
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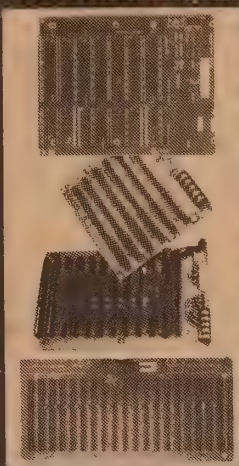
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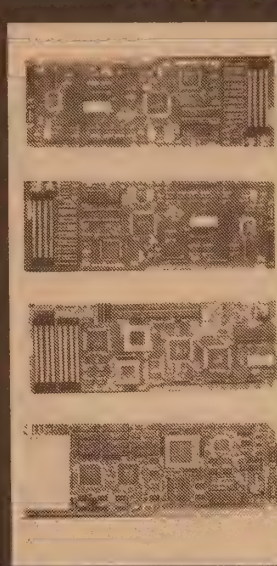
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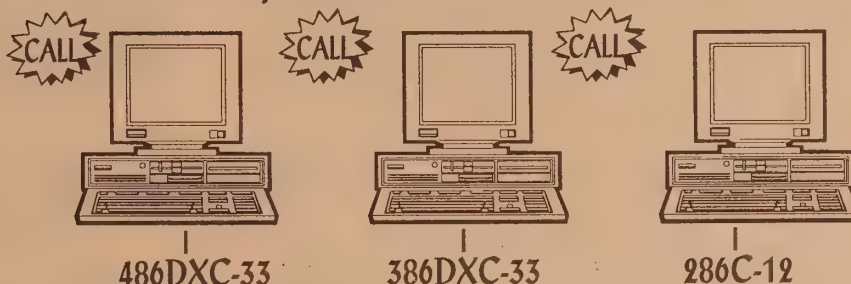
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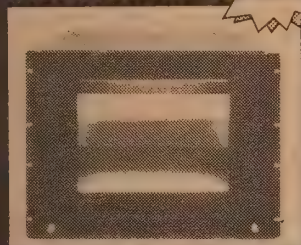
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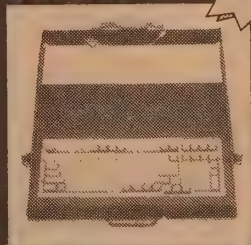
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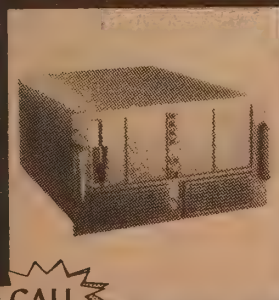


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to turn a profit. However, with over 2.1 million users on 1.2 million accounts, it has shown that there is a market for videotext in the United States.

The most famous example of videotext gone right is France's Minitel system. Over five million Minitel terminals are installed in France. The system is so ubiquitous that using it has been called "as mundane in France as croissants." It was set up in 1980 as a social service to prepare a "technologically illiterate" society for the information age. Now a full-fledged industry, Minitel has created ten thousand new jobs and is generating more than \$1 billion in revenues each year. The various services accessible from Minitel include banking, transportation, phone number lookup, and soft-porn bulletin board systems.

Minitel began with only a telephone directory service. The telephone company stopped printing standard telephone directories, which spurred Minitel's usage. Minitel terminals are now available in public places such as post offices. New services quickly appeared on Minitel, including popular chat lines. One chat service receives revenues of \$135,000 a month, and another handles one hundred eighty thousand hours of calls a month.

In the first six months of 1989, there were three hundred seventy million Minitel calls, up 21% from the same period in 1988. As of November, 1992, there were six million Minitel users worldwide and eighteen thousand services, proving there is a market for videotext under the right circumstances.

Minitel has been a success in France for several important reasons:

- It is subsidized by the government. Costs to users are kept low because the government has invested heavily in Minitel. Commercial videotext ventures in other countries have not had a similar financial benefit.
- At the start, users did not have to pay for the equipment. During the first few years of Minitel service, terminals were given away. The terminals cost \$165 to manufacture, and the French telephone company hopes that increased telephone traffic will recover the cost of free distribution. Users now may pay a nominal fee to purchase or rent Minitel terminals.
- Minitel is easy to use, featuring a single national access number, no sign-up fees,

and a uniform menu system. Also, a Minitel terminal doesn't take up much space.

Although differing
opinions abound on
this subject, time
has shown that
although
videotext increases
competition for the
public's time and for
advertising dollars,
it doesn't pose a
huge threat to
other media.

HOW WE USE VIDEOTEXT

One study that investigated consumer perceptions of videotext suggested that it is perceived as being more "personal" than noninteractive media. It also suggested that in some situations, the new electronic media are harder to use.

Upscale farmers have found that videotext is the best source for perishable, high-

ly volatile information about market prices. For more stable information, however, videotext is complementing, not replacing, older sources of information.

A study that tracked how much online time was spent reading various types of information on one videotext service, Dow Jones News/Retrieval, showed that just over a third (36%) of the time was spent reading news, weather and sports; 12% was used checking the airline schedules, 9% in reading medical information, 8% for company news, 7% in movie reviews and about 5% in the encyclopedia. The remaining time was used to access stock data and other business information.

However, while newspapers lend themselves to "scanning," the format of videotext forces information into a more structured system. Because of the hierarchical structure of databases, it is often difficult to browse a videotext system without a goal in mind.

The structured format of videotext may cause people to miss important information that they would have received using other media. Without the editor's cues of newspapers and magazines, users may only find information that is interesting and agreeable to them—and miss important news and social issues.

VIDEOTEXT AND BUSINESS

Although some advertisers have accepted videotext, some have not been quick to embrace it. On-screen advertising defrays the online cost of Prodigy, which devotes about one-fifth of the screen to advertisements. The system has demographic data on each user, allowing advertising to be sent only to the precise advertising market desired.

However, it has been suggested that this practice produces fragmented advertising audiences, and leads to the inability to reach mass markets. If the new, more specialized markets are too small for advertising support, the service will lose money as advertisers shy away.

America Online features far fewer advertisers than Prodigy. According to the company, AOL users aren't very interested in shopping online.

The future of videotext for business is bright. The trade-off is that larger corporations will support interactive media in the home only if the information can be used for marketing purposes.

In Japan, videotext is being used for mar

continued on page 227

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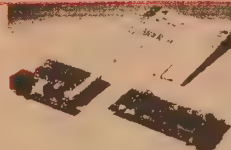
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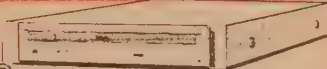
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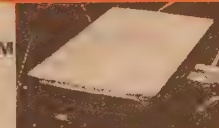


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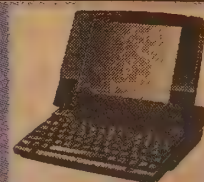


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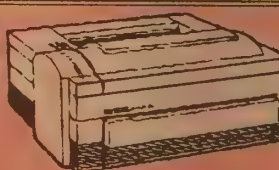
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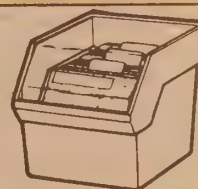
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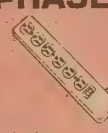
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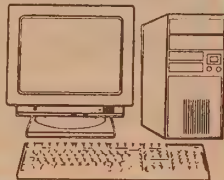
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3.5" 1.44MB Floppy Drive
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Monitor Not Included
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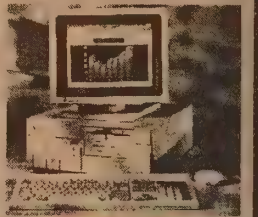


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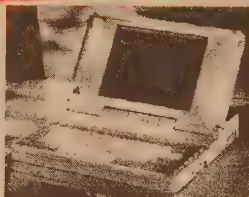
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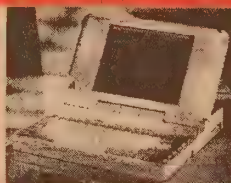


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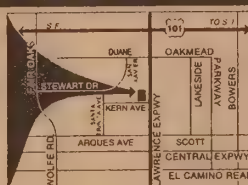
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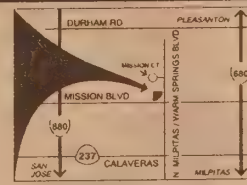
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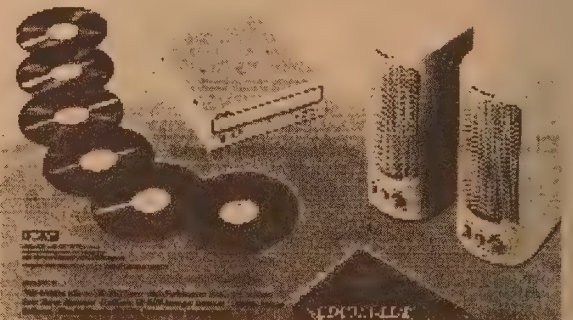
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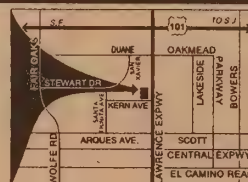
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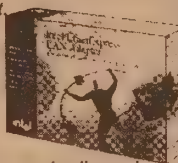
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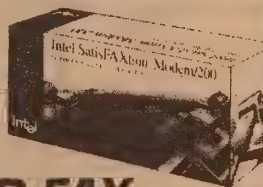
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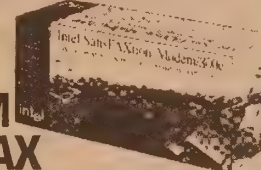
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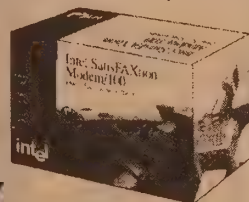
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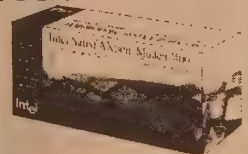
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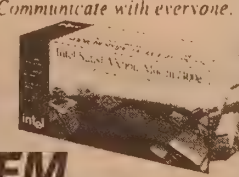
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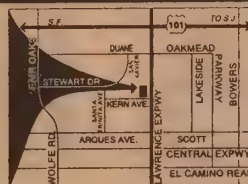
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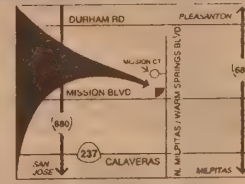
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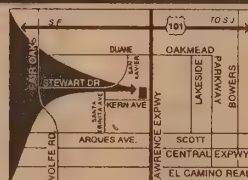
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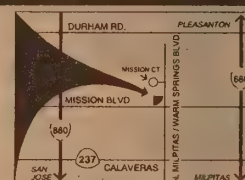
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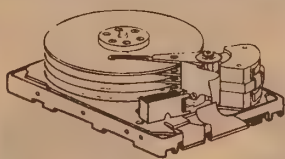
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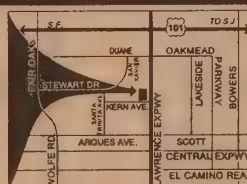
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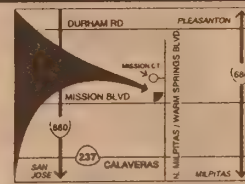
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CPI 502402 #1704646

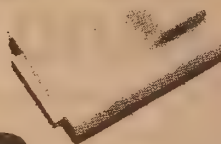
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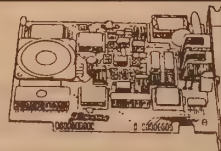
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9600 SEND FAX AND 4800
RECEIVE WITH 2400B DATA
MODEM**

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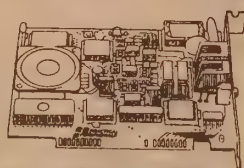
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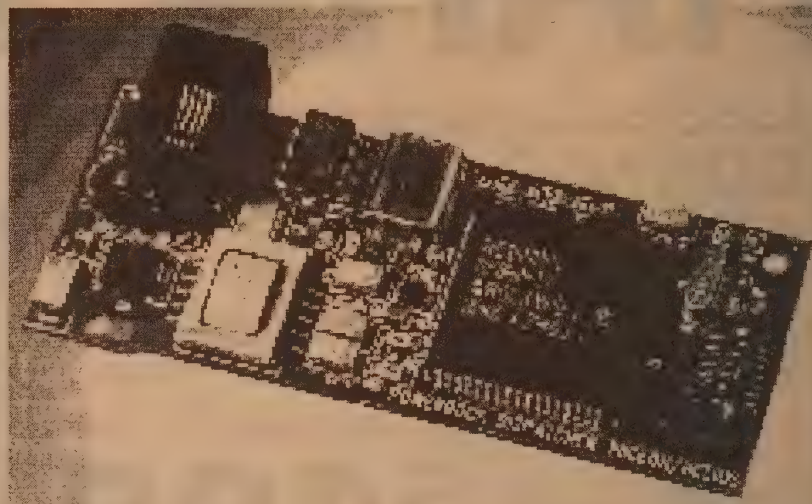
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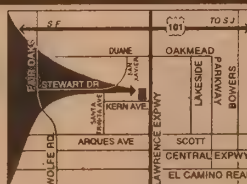
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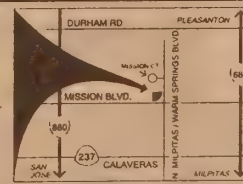
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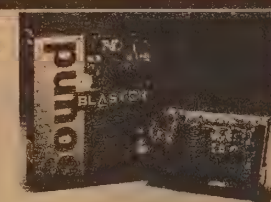
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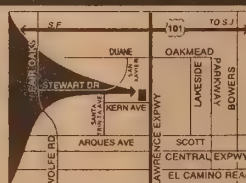
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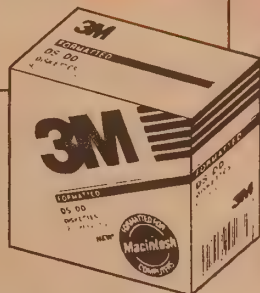
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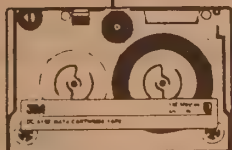
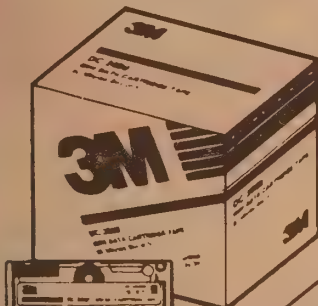
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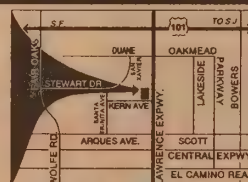
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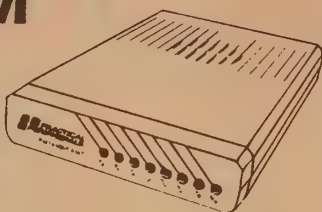
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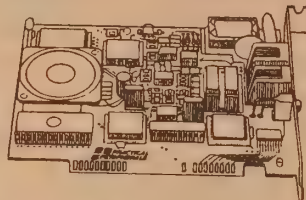
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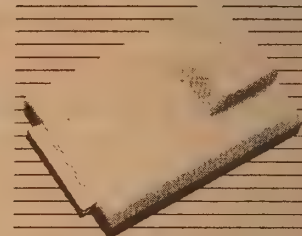
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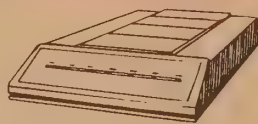


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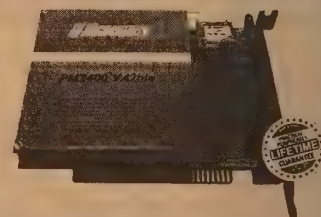


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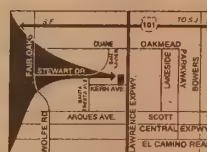
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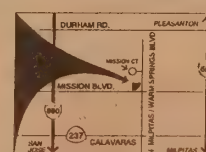


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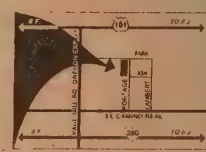
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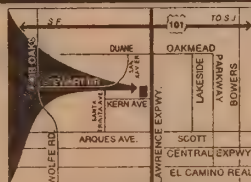
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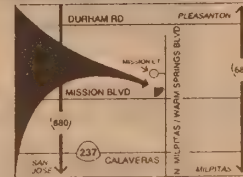
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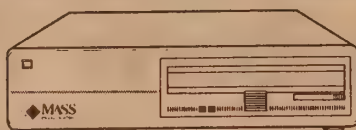


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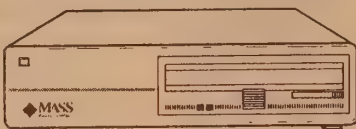
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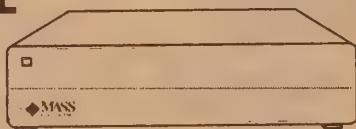
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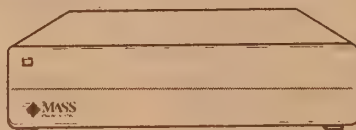


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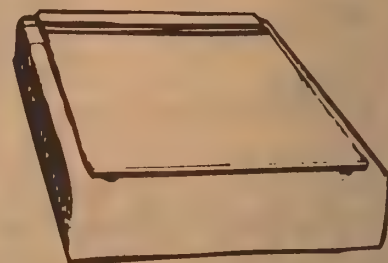


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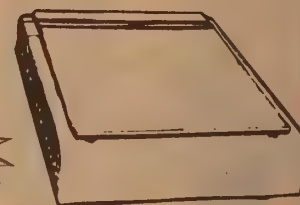
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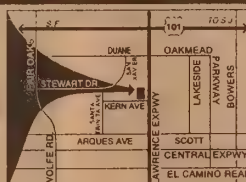
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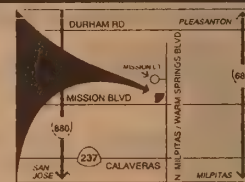
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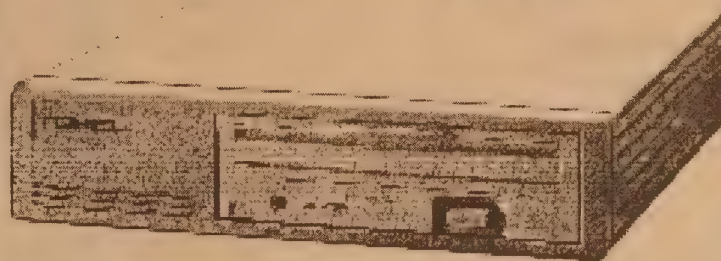
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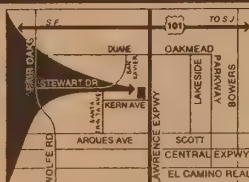
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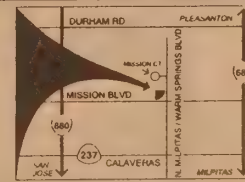
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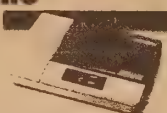
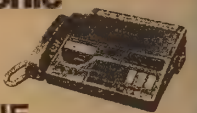
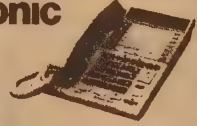
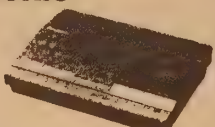


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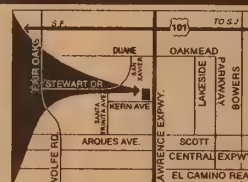
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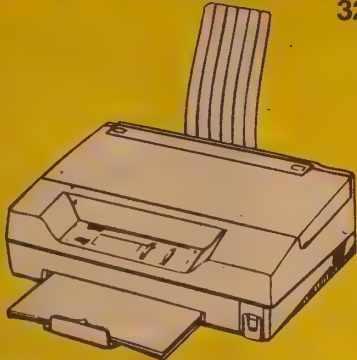
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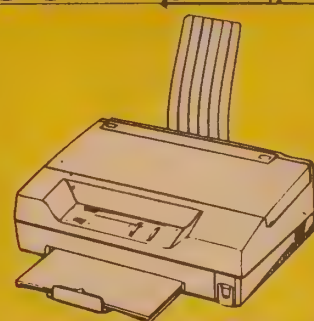
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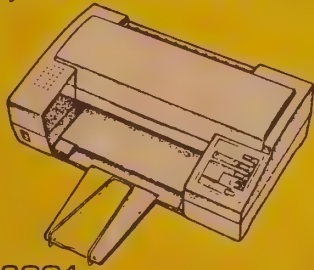
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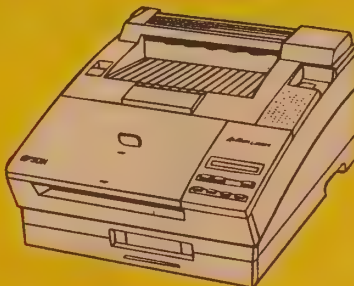
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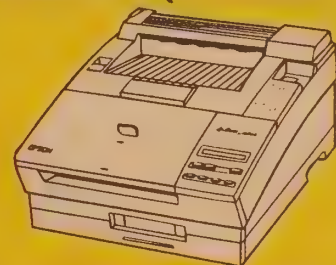
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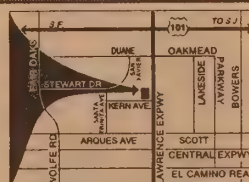
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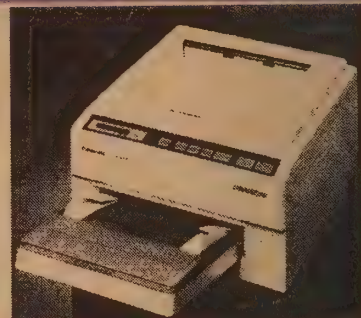
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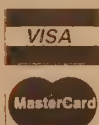
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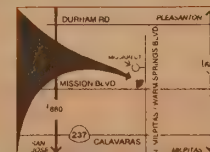


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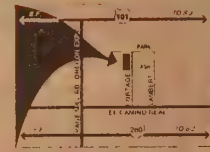
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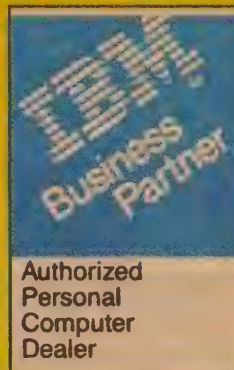
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Intel 486DX 33MHz CPU • 170MB Hard Drive
4MB Memory Expandable to 64MB • 128K Cache
3.5" 1.44MB/5.25" 1.2MB Floppy Drives
5 AT Slots • 14" SVGA Color Monitor • Local Bus SVGA
IBM Mouse • IBM Keyboard • Fax/Modem
Novell® certified

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Microsoft Works for Windows • PRODIGY • P/S1 Tutorial, Index
Fitness, • Virus check • PS/1 Edition American On-line

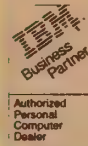
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IBM PS/1 **AT BUS** Expert 2155-S80 486DX2-50MHz 250MB SVGA SYSTEM



Intel 486DX2 50MHz CPU • 80MB Hard Drive
4MB Memory Expandable to 64MB • 128K Cache
3.5" 1.44MB/5.25" 1.2MB Floppy Drives
5 AT Slots • 14" SVGA Color Monitor • Local Bus SVGA
IBM Mouse • IBM Keyboard • 2400 BPS Modem
Novell® certified

Preloaded Software: MS DOS 6.0 • Microsoft Windows 3.1
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\$2399



IBM PS/1 **AT BUS** Expert 2155-S85 486DX2-66MHz 250MB SVGA SYSTEM



Intel 486DX2 66MHz CPU • 250MB Hard Drive
8MB Memory Expandable to 64MB • 128K Cache
3.5" 1.44MB/5.25" 1.2MB Floppy Drives
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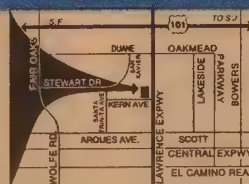
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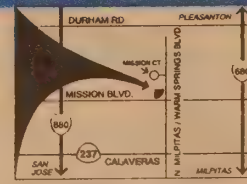
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CASIO B.O.S.S. w/64KB MEMORY

This business organizer scheduling system comes packed with powerful functions that are practical and easy to use. The QWERTY Keyboard, telephone directory, calendar, memo function, schedule alarm, world time function, home time function, and schedule keeper will prove to be an invaluable tool in keeping your busy days in order. An excellent investment at...

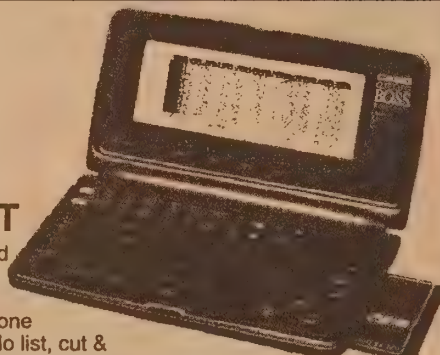


\$89⁹⁵

MODEL SF-5300
#1671137

CASIO 256K EXECUTIVE B.O.S.S. w/BUILT-IN SPREADSHEET

Casio's latest business organizer comes equipped with a business card management function, schedule function, two month calendar display, world time, a daily alarm, schedule alarm, telephone directory, memo functions, reminder function, to do list, cut & paste function, and spreadsheet function (compatible with Lotus 1-2-3 data) all displayed on a wide 40 character by 10 line screen. An Invaluable investment at only...



\$278

MODEL SF-R20
#1728473

PSION SERIES 3

POCKET SIZED 256KB COMPUTER W/ BUILT-IN SPREADSHEETS

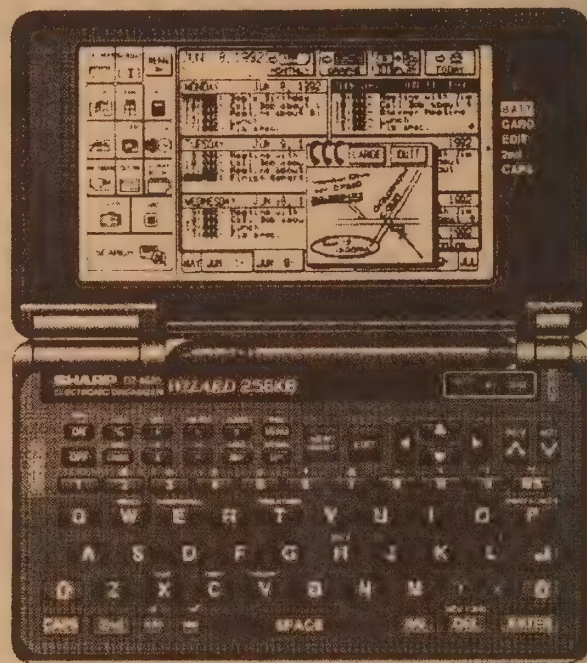
Psion has redefined the state of the art in hand held computers with the new Series 3. It may be small, but this pocket-sized programmable computer comes equipped with features found in desktop machines plus powerful built-in software, including a full specification word processor and outliner that's compatible with Microsoft word. When using the Series 3 you will quickly learn from the system of graphic displays and option list how easy the Series 3 is to use. And with Psion's unique Multitasking Operating System, as many of the facilities as you want can be used at the same time! Other features include an automatic phone dialer, world information, a time and personal management file, powerful graphics programming language (OPL/w) which will enable you to write your own applications and two expansion ports for plug in SSD devices for unlimited memory and software.



\$348

MODEL SERIES 3
#1763861

SHARP® 512K PERSONAL ORGANIZER w/ TOUCH SCREEN TECHNOLOGY



This Sharp Wizard lets you leave your portable computer at home but puts the power of that computer in your pocket! Here's a small sampling of the innovative features. Touch screen technology which allows you to write or draw on the screen using the Wizard pen, filter which organizes related data into folders that can be transferred to another touch screen Wizard Via infrared, and a true word processor with a large screen display and a keyboard that's 75% the size of a standard PC keyboard. The possibilities are endless at only...

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MODEL
OZ-9600 II
#1797152

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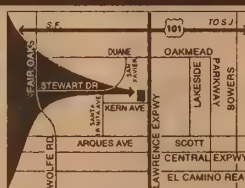
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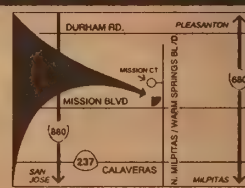
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This Sony answering machine is the simplest to operate. Just look on the playback button and it tells you how many messages you have, press to hear them.

\$67⁹⁵

MODEL TAM-30
#1481910

BUSINESS PHONES

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SPEAKERPHONE w/16# MEMORY

From the leader in cordless phone technology comes a new line of feature phones. This unit has a crystal clear speakerphone, 16 number memory and more!

\$47⁹⁵

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#1699142

PHONE/ANSWERING MACHINE COMBO

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TELEPHONE AND ANSWERING MACHINE

Now you can have the marvelous Sony quality telephone and answering machine with digital outgoing message for a mere...

\$97⁹⁵

MODEL IT-A205
#1529759

CORDLESS PHONES

SONY.

CORDLESS TELEPHONE WITH PAGING

This hot Sony cordless phone has 7 day standby, Paging and out-of-range warning system. This handy unit can sit on a table or hang on the wall! All this for only...

\$67⁹⁵

MODEL SPP-57
#1720707

CORDLESS/ANSWERING MACHINE COMBO

SONY.



10 CHANNEL CORDLESS PHONE w/ ANSWERING MACHINE

This innovative product from Sony actually combines a ten channel cordless phone with a full featured answering machine in one sleek package. Features include 256 security codes, 7 day stand-by, compander noise reduction and remote message retrieve.

\$147⁹⁵

MODEL SPP-A20
#1714074

SONY.



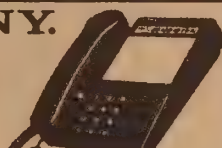
DIGITAL ANSWERING MACHINE

This Digital Answering Machine from Sony has a LED message counter, Time/Date stamp, remote message retrieval & much more for only...

\$97⁹⁵

MODEL TAM-50
#1481921

SONY.



SPEAKERPHONE w/LCD DISPLAY

Have you ever made a mental note to call someone, and then forgot? Well, you won't have that problem anymore because this speakerphone comes equipped with an automatic call timer/reminder alarm! Now only...

\$77⁹⁵

MODEL IT-D150
#1516889

SONY.



SPEAKERPHONE ANSWERING MACHINE

This stylish speakerphone answering system comes equipped with a digital message counter, auto interrupt, two-way conversation recording, 5-number one-touch dialing, and, 15-number speed dialing, an excellent value at...

\$127⁹⁵

MODEL IT-A305
#1529760

SONY.



10 CHANNEL CORDLESS PHONE w/LIGHTED KEYPAD

This 10 channel cordless phone offers out of range alert, extended 7-day battery standby power, 10 number speed dialing, and many other features for only...

\$97⁹⁵

MODEL SPP-77
#1766990

SONY.



10 CHANNEL CORDLESS PHONE w/ ANSWERING MACHINE AND VOICE TIME DAY STAMP

This innovative product from Sony actually combines a ten channel cordless phone with a full featured answering machine in one sleek package. Features include 256 security codes, 7 day stand-by, compander noise reduction and remote message retrieval.

\$177⁹⁵

MODEL SPP-A40
#1720578

SONY.



DIGITAL TELEPHONE ANSWERING SYSTEM

This sophisticated multi-functional digital telephone answering system is perfect for the home or office! With features like dual outgoing messages, LCD menu display, digital message storage, direct access message retrieval, message transfer, and built-in speakerphone. An excellent value at...

\$177⁹⁵

MODEL IT-A4000
#1629750

SONY.



2-LINE FEATURE PHONE w/ SPEAKERPHONE

Phones with 2-line operation are relatively common, but this phone offers a distinctive ring for each line! The LCD indicator will tell you the number dialed and the time. Now only...

\$97⁹⁵

MODEL IT-D250
#1516904

SONY.



SPEAKERPHONE ANSWERING MACHINE

This stylish speakerphone answering system comes equipped with a digital message counter, auto interrupt, two-way conversation recording, 5-number one-touch dialing, and, 15-number speed dialing and voice time/day stamp, an excellent value at...

\$147⁹⁵

MODEL IT-A505
#1529771

SONY.



10 CHANNEL CORDLESS SPEAKERPHONE & DIAL-OUT KEYPAD

From the newest generation of Sony cordless phones comes this model which offers base speakerphone and dial-out keypad giving you the option of answering or making calls from the base or handset, 2-way paging/intercom, 10 number memory, dual rechargeable battery pack, handset volume control, and much more for only...

\$177⁹⁵

MODEL SPP-180
#1720671

SONY.



10 CHANNEL CORDLESS SPEAKERPHONE w/ ANSWERING MACHINE AND VOICE TIME DAY STAMP

This innovative product from Sony actually combines a ten channel cordless phone with a full featured answering machine in one sleek package. Features include 256 security codes, 7 day stand-by, compander noise reduction and remote message retrieval. As an added bonus, the base unit is a speakerphone with adjustable volume

\$197⁹⁵

MODEL SPP-A60
#1720590

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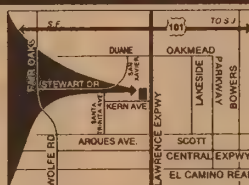
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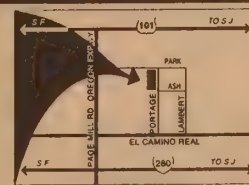
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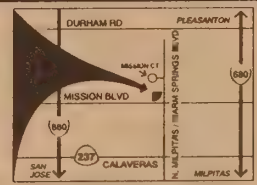
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CELLULAR TOTE PHONE

This new addition to the Motorola family of cellular phones offer 30 number memory and 3 full watts of power for only...

Service Activation Not Required
No Sales To Dealers Or Resellers
Limit One Per Family

\$169

Model
S3230
#1751866

uniden®

HANDHELD PORTABLE CELLULAR PHONE



Our latest handheld portable cellular phone is priced to go and includes dual NAM, 30 number memory, auto redial, 3 call timers, one touch redial, call restriction, signal level meter, low battery warning signals, plus illuminated LCD, a battery and AC adapter. All for the unbelievably low price of only...

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No Sales To Dealers Or Resellers
Limit One Per Family

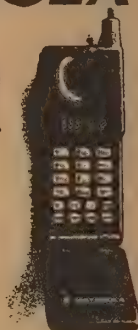
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Model
CP6000
#1787539



MOTOROLA

CELLULAR FLIP PHONE



This premium value cellular phone from Motorola comes equipped with 30 number memory, LED display, call timer, signal strength meter, a battery with 75 minute total talk time, an overnight charger and a caring case for only....

Service Activation Not Required
No Sales To Dealers Or Resellers
Limit One Per Family

\$339

Model
DPC-550
#1635999



MOTOROLA

ALPHA MICRO-TAC CELLULAR PHONE



If it's small and lightweight that your looking for, this is the cellular phone for you! With its 101 alpha numeric memory, a desktop charger, and standard battery. This technologically advanced cellular phone can be yours only...

Service Activation
Not Required
No Sales To Dealers
Or Resellers
Limit One Per Family

Model
DPC-950 BASE
#1744545

\$399⁹⁵



MOTOROLA

MICRO TAC LITE CELLULAR PHONE



Weighing in at 7.7 ounces and measuring 11.6 cubic inches, this is one of the lightest and most advanced cellular telephones available. With 100 alpha numeric memory, are tractable antenna, standard battery, and desktop charger, you can receive state of the art performance and design for only...

Service Activation
Not Required
No Sales To Dealers
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Limit One Per Family

Model
MICROTAC
LITE BASE
#1750739

\$559

AUDIOVOX®

MINIVOX LITE 6.2oz. HAND-HELD PORTABLE CELLULAR PHONE



Audiovox has utilized the latest in micro electronics to deliver the most advanced hand-held portable in one very compact package. The Minivox Lite features include a Nickel metal hydride battery pack, travel battery charger, large send and end keys, dual retractable antenna, alpha search, battery level indicator, 101 alpha numeric locations, 2 one touch speed dialing, five function call timer, and much more for just...

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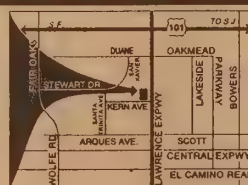
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NEW FRANCHISE

HITACHI 20Mhz DIGITAL STORAGE OSCILLOSCOPE



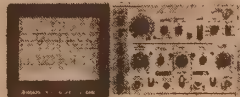
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V-6023
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With Single Time Base & High Resolution CRT. The usefulness of Hitachi scopes is extended to cover an array of new measurement applications. 2 channel • 6 inch screen 3 Year Warranty.

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FLUKE 87 4 1/2 DIGIT TRUE RMS DIGITAL MULTIMETER

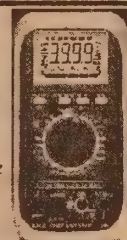


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• Min/Max/Average recording mode w/Min/Max alert
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• Back-lit display, touch hold, relative modes
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UNIVERSAL 3 3/4 DI-LOG DIGITAL MULTIMETER



True RMS, 4000 count display analog bar graph, high resolution mode. Autoranging • Temp • Capacitance Frequency • Min/Max Recording Ruggedized and water resistant. Five year limited warranty. DL187T #1763506

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Protek 2MHz SWEEP FUNCTION GENERATOR



Frequency Range: 0.02Hz to 2MHz/7 Ranges
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B-801
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BK PRECISION 100MHz PORTABLE FREQUENCY COUNTER



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Charger/AC adapter included

BK-1803B
#155339

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w/AUTORANGING & 1 YEAR WARRANTY

- True Rms AC
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- Sleep Mode
- Min/Max Memories
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- 20A Fused
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- Capacitance
- Memory Read Function
- 0.3% Basic Acc.

AR-MODEL 37
#1742369

FREE BOOT
W/PURCHASE
#1744648

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AMERICAN RELIANCE INC. 3 1/2 DIGIT DIGITAL MULTIMETER



w/AUTORANGING & 1 YEAR WARRANTY

The Model 33 is a versatile digital multimeter with an impressive range of capabilities offered at an incredible price. This unit has data-hold functions & a basic accuracy of 0.5% also audible continuity & fused 20A input.

MODEL 33
#1742347

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W/PURCHASE
#1744648

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- Measures voltage, resistance and current
- 0.5% DCV accuracy
- DC current to 10A • Resistance, 0.1 to 20M
- Diode Test
- Drop resistant case

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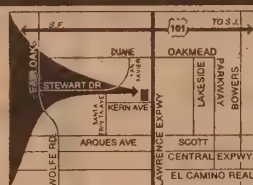
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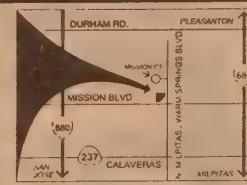
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MANY OTHER MAJOR BRANDS IN STOCK

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POPULAR UNIDEN
REPLACEMENT
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N50031 **\$6⁵⁹**
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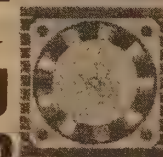
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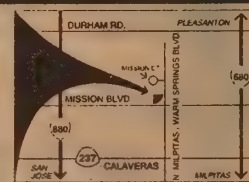
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The HUB-820T 10BaseT Ethernet Repeater utilizes the latest in Ethernet Repeater technology and provides connection to eight 10BaseT (twisted pair) ports. It is an IEEE 802.3 compliant multi-port repeater supporting full interoperability in all 10BaseT installations. The auto-partitioning feature will detect an errant port and disconnect the port from other operational ports, preventing a total network shutdown. The HUB-820T will automatically re-enable the disconnected port once the problem has been corrected. The Repeater offers a practical, innovative enhancement to existing or new installations. ScienTech R&D, Inc., 2845 Whipple Rd., Union City, CA 94587. (510)429-8690.

MACINTOSH HARDWARE

DAYSTAR TURBO 040 FOR IISI

DayStar's Turbo 040 is PDS-based 68040 CPU accelerator for the 25MHz 030 Macintosh IIsi. Turbo 040 is currently available in 25 and 33MHz. An additional cache, FastCache Turbo, is also available for added performance. It requires no software to run, and not modifications to your system file. The IIsi/IIfx version of the Turbo 040 works with a DualPort or Adapter IIsi available for the Universal PowerCache for the IIsi. These adapters feature a cache slot for the Turbo 040, and a passthrough PDS slot that can be used with any PDS-based video or network cards. DayStar Digital, Inc., 5556 Atlanta Hwy., Flowery Branch, GA 30542. 1-800-962-2077.

ACCOMPLICE ACCELERATOR FOR IISI

Accomplice, designed for the Macintosh IIsi, is a 50MHz 030 accelerator with a 32K external cache. The passthrough PDS allows users to plug any IIsi PDS cards, including ethernet and video capture cards, directly into Accomplice's passthrough slot. It requires no software to run. However, software is provided to allow users control of the enhanced SANE (Standard Apple Numerical Equation) routines to accelerate math functions and to control the 32K external cache. Systems patches are not required. (\$699) Extreme Systems, Inc., 1050 Industry Dr., Tukwila, WA 98188. 1-800-995-2334.

Continued

PRODUCT UPDATES

➤ **Adept Computer Solutions** released **Street Wizard 3.1**, its street mapping software package for Windows. Adept Computer Solutions, Inc., 1742 Garnet Ave., Suite 206, San Diego, CA 92109. 1-800-578-MAPS.

➤ **Autodesk** introduced **AutoCAD Release 12** for IRIS Indigo workstations. Autodesk Corp., 2320 Marinship Way., Sausalito, CA 94968. (415)332-2344.

➤ **DataEase** released **DataEase Express for Windows, v1.1**. The update features a new import/export facility, faster performance, improved interoperability with DataEase 4.53 for DOS, access to additional SQL database engines, more flexible LAN configuration options, and maintenance enhancements. This update is free for registered owners. DataEase International, Inc., Seven Cambridge Dr., Trumbull, CT 06611. (203)374-8000.

➤ **Desktop Engineering International** released **DE/Cartes v2.0**, this PC Document Manager that works by cataloging all the documents in your office. Desktop Engineering International, Inc., 1200 MacArthur Blvd., Mahwah, NJ 07430. (201)818-9700.

➤ **Precise Electronics** released **UNI-ZIP V2**, a data compressing archiver for 386 UNIX/XENIX systems, Sun SPARC, and IBM RS/6000 workstations. Precise Electronics, Inc., 31 Englewood Ave., Brookline, MA 02146. (617)566-6867.

➤ **Intuit** introduced **Quicken 4 for Macintosh**. Current users can purchase Quicken 4 from Intuit directly for \$29.95, plus \$5 shipping and handling, by calling 1-800-624-8742. Or, current users can buy Quicken 4 and receive a \$10 mail-in upgrade rebate.

➤ **Light Source** released **Ofoto v2** with support for a variety of Macintosh-compatible color flatbed scanners, including scanners from Hewlett-Packard, Microtek, LaCie, Epson, and UMAX. Registered owners can upgrade for \$95; owners who received Ofoto (grayscale) with the Apple OneScanner can upgrade for \$75. Light Source, Inc., 17 E. Sir Francis Drake Blvd., Suite 100, Larkspur, CA 94939. (415)461-8000.

➤ **Software Publishing Corp.** announced a special upgrade offer, allowing users of **Harvard Graphics for DOS** (2.x or later) or competing products to move to the current version of **Harvard Graphics for Windows 1.03** for \$149. With the offer, users also receive a free upgrade to the next major release from Software Publishing. Software Publishing Corp., 3165 Kifer Rd., PO Box 54983, Santa Clara, CA 95056-0983. Customer Service, (408)988-7518.

➤ **Spyglass** released **Spyglass Transform 3.0**, a powerful visual data analysis and presentation tool for UNIX workstations and Macintosh computers. This release, which takes a major step to create identical feature sets for UNIX and Macintosh, includes enhanced labeling techniques, a powerful macro scripting language, a greatly enhanced data import facility and support of MathLink from Mathematica. Spyglass, Inc., 1800 Woodfield Dr., Savoy, IL 61874. (217)355-6000.

PC SOFTWARE

XTRADRIVE 3.0

XtraDrive data compression software can double the capacity of any drive. The new version, 3.0, features full support for removable media such as floppy drives, Bernoulli and SyQuest drives, optical disks, and others. Compression is designed to be as invisible as possible for the user: after XtraDrive is installed, a second "virtual" hard drive appears on the system that is as large as the original—no other tweaking is necessary. For floppy diskettes and other removable media, XtraDrive automatically senses whether disks are compressed or not, allowing them to be used interchangeably. This program will also automatically load a limited version of itself on compressed floppy disks, so that they can be used for reading and writing on any IBM compatible PC. (\$98) Integrated Information Technology, Inc., 2445 Mission College Blvd., Santa Clara, CA 95054. (408)727-1885.

RAPID RENDER 860

Rapid Render 860 software accelerates rendering of Autodesk's 3D Studio multimedia and animation authoring software by an average of two to five times when coupled with a Video Seven Fire board and a 386-based PC. It also improves the quality of synthetic images that employ mixed shading techniques, photo-realistic textures and reflections, variable light sources, shadows, and atmospheric effects. The software is compatible with Video Seven's Fire and GX-860 boards, MS-DOS 5.0, and 3D Studio releases 1.x and 2.x. (\$599) Video Seven Corp., 46305 Landing Pkwy., Fremont, CA 94538. (510)656-7800.

RXAUTOICON DISPLAY DRIVER

RxAutoIcon v2.0 for Windows is a fully featured ADI 4.2 compatible display list driver for AutoCAD Release 12 for Windows. Designed to be compatible with any graphics board that is capable of running Windows, RxAutoIcon for Windows will accelerate any standard display device by bypassing the Windows Graphics Device Interface (GDI) to reduce graphics bottlenecks inherent within Windows. It is switchable to use either a 16-bit or 32-bit display list for maximum user control. RxAutoIcon for Windows adds complete bitmap support for AutoCAD Release 12 for Windows. Most popular monochrome and color raster file formats are supported. (\$195) Expert Graphics, Inc.,

1908 Cliff Valley Way., Suite 2010, Atlanta, GA 30329. 1-800-648-7249.

SUPERTYPE MASTER LIBRARY

SuperType Master Library, from IQ Engineering, gives Windows users an additional one hundred six scalable typefaces in one easily installed software package. This affordable package enables users of lower-cost dot matrix, inkjet, or other non-PostScript printers to print high-quality PostScript and TrueType scalable fonts. The Library includes software to install IQE's quality fonts in either Adobe Type Manager or Windows 3.1's built-in TrueType format, and combines ninety-three IQE TrueType and PostScript fonts with Adobe Type Manager and its thirteen scalable fonts for maximum versatility. (Suggested list price for Master Library is \$200) IQ Engineering, Inc., 685 N. Pastoria Ave., Sunnyvale, CA 94086. 1-800-765-3668.

COMMENCE 2.0

Commence 2.0, Windows personal information management (PIM) software, gives users an easy way to store, organize, view, and share information. In addition to all of the basic features of a PIM such as calendaring, contact management, and task management, Commence provides powerful new features for transparently sharing Commence databases, view, categories, and connections over the network. It also includes a unique database synchronization feature for PCs not connected to the LAN. As an automated networked information manager for Windows, Commence lets workgroups automate tasks, coordinate schedules, and share information and applications in ways that make sense to them and other workgroup members. (Standalone/client or server editions is \$395; discounted network bundles, including a 3-user pack is \$695) Jensen-Jones, Inc., Pkwy 109 Office Center, 328 Newman Springs Rd., Red Bank, NJ 07701. (908)530-4666.

AUTOCAD BASICS

AVT's AutoCAD Basics, computer-based training software, includes five disks which contain the same seventy-two lessons found in its AutoCAD Basics Videos and Lesson Sets. This software is not a simulator. Select the lesson you wish to learn and the training program automatically boots AutoCAD. Each lesson walks you through an AutoCAD command, demonstrating how to use the command and all of its options, and provides

lock-step instruction of command operations. American Video Training, PO Box 127 Concordville, PA 19331-0127. 1-800-554-1499.

SECUREXCHANGE FOR DOS OR WINDOWS EMAIL

SECUREExchange, from RSA Data Security and Datamedia Corp., is the first Windows-based encryption product that utilizes the patented RSA Public Key Cryptosystem. Allowing DOS or Windows-based email users to tap the powerful RSA algorithm, SECUREExchange is built specifically to secure existing email installations. It will enable employees to use email for even the most confidential or secret information. (Suggest list prices of \$995 for a 25-user license up to \$19,995 for a 1000-user license) RSA Data Security, Inc., 100 Marine Pkwy., Redwood City, CA 94065. (415)595-8782.

REVIEWS

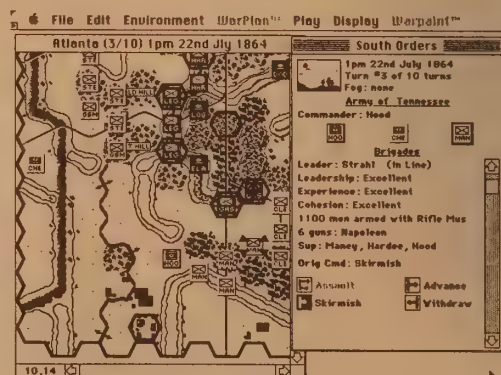
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PRODUCT SPOTLIGHT

West Point classmate; but he had the advantage of an almost unlimited supply of men, beans, and bullets.

As a result, the last year of the American Civil War was a series of grinding battles of attrition. The growing lethality of rifled muskets and shell-firing artillery forced armies to spread out across wider and wider fronts, making operations increasingly difficult to control (a problem that was not solved until reliable field radios were developed in the 1940s). To survive the storm of lead, troops on both sides learned to dig in, first spontaneous foxholes and gun positions, later planned trench lines and complex fortifications.

The last volume in SSG's series of Civil War simulations includes six complete battles: The Wilderness, May 5-6, 1864
Spottsylvania, May 10-12, 1864
Cold Harbor, June 1-3, 1864
Atlanta, July 22, 1864
Franklin, November 30, 1864
Nashville, December 15-16, 1864

The game system focuses on the problems of command and control. You have to move your army commander frantically around the battlefield to give new orders to your corps, divisions, and brigades, otherwise they will keep following their original orders, or simply relapse into inactivity. Victory is determined by a point system based on geographic objectives, troop losses, and leader casualties.

The map is a hexagonal grid on a scale of 300-500 yards per cell. Each turn represents an hour of real time. The program includes an elaborate set of design tools that allow you to modify the scenarios or design your own.

The program is installed from two 800K disks. Both monochrome and 16-color scenarios are included. Documentation is adequate. A glossy, full-color reference map of all the battlefields is included.

SSG's American Civil War game system is a good computer implementation of the conventions of board wargaming. The most serious flaw in the system is the treatment of leader units. Leader units can occupy terrain, and because they are virtually indestructible, this can create odd, unrealistic situations.

The program can graphically display the condition of units (as they take losses they get tattered around the edges) but not their facing or formation. It will be interesting to see if SSG is able to adapt this game system to the ever-popular Napoleonic Wars. (Strategic Studies Group, Inc., PO Box 30085, Pensacola, Florida 32503-1085. 904/469-8880; Fax: 904/469-8885)

Graphics And Animation: 7
Sound: 8
User Interface: 7
Overall Value: 8

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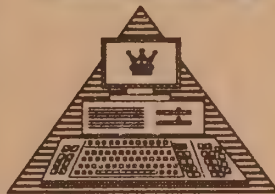
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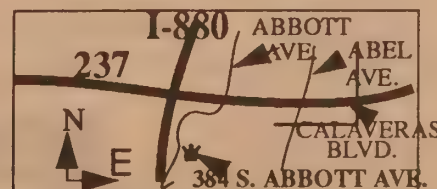
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PRODUCT SPOTLIGHT

CHess MANIAC 5 BILLION AND 1

Designed By: Paul Mogg, Erick Jap
Programmed By: Erick Jap, Peter Ward, Heather Mace
Published By: Spectrum HoloByte
For: MS-DOS (2MB RAM, 25MHz 80386SX or faster CPU, VGA graphics, supports popular audio cards)
List Price: \$69.95 (CD-ROM version is \$59.95)

Chess takes itself very seriously. Look at Bobby Fischer. Chess is not a game, it is a way of life. Since the 1950s, generations of programmers have struggled to write code that would enable the feeble binary logic of a computer to master the vast combinatorial space of a chess game. Vastly expensive custom-built chess machines are beginning to approach the performance of a Grand Master on one of his depressive Russian-winter bad days. There are quite a few chess programs you can buy in shrink wrap



and run on your home computer; they are beginning to approach the performance of a Serious Player on a good day. Chess on computers combines most of the worst features of:

- (a). chess, and
- (b). computers.

So something like Chess Maniac was inevitable. This parody of other computer chess programs was a joint venture of National Lampoon and Spectrum HoloByte.*

You can play in two modes: Bawdy and Boring. In Boring Mode you get conventional chess pieces that behave in a conventional way. In Bawdy Mode the chess pieces are animated figures that perform rude

little skits whenever a capture takes place. The 72-page manual is a parody of CQ (*Chessplayer's Quarterly*).

The "optimum system" for this game is an 80486 with 4MB of RAM, 256-color VGA

Graphics And Animation: 9
Sound: 8
User Interface: 7
Overall Value: 7

and Roland Sound Canvas and Sound Blaster cards for the full music and sound effects. The game is installed from compressed files on twelve high-density 3.5" disks, and takes up 27MB of hard disk space—a convincing argument for the CD-ROM version.

When the men on the chessboard get up and tell you where to go, don't blame the mushrooms, blame Chess Maniac. (Spectrum HoloByte, Inc., 2490 Mariner Sq. Loop, Alameda, CA 94501. 510/522-3584)

THE 7TH GUEST

Designed By: Graeme Devine and Rob Landeros; Trilobyte Software
Published By: Virgin Games
For: MS-DOS (requires at least MPC Level 1 compatibility: 386DX CPU, 2MB RAM, 16-bit SVGA card with 512K VRAM, CD-ROM drive with at least 150 kps transfer rate, MSCDEX driver v. 2.2 or higher, MS-DOS v. 5.0 or higher)
List Price: \$79.95

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—Bill Gates, Chairman of Microsoft.

Marketroids dream of such a rare and wonderful box-cover endorsement from William Gates himself. Microsoft has long dreamed of a CD-ROM title that would be compelling enough to overcome diehard customer resistance to CD-ROM technology. The 7th Guest from Virgin Games might be the one. Virgin Games? Yes, it's the same logo as Virgin Airlines and Virgin Records; rather British, slightly eccentric but definitely smart money.

The 7th Guest is an Interactive Drama (a term trademarked by Virgin) set in a haunted house. The spaces are darkly lit, richly textured and exquisitely rendered in 3D geometry. The characters are video overlays of live, professional actors, broadly overacting. The user interface is a simple and elegant set of animated cursors that give you direct visual feedback as you feel your way through the environment with the mouse. A beckoning skeletal hand, for example, means that you are over an entrance to another part of the house, while a throbbing brain means that you have found a puzzle that must be solved before you can advance. Some of the puzzles are extremely challenging, but there is a book of clues lying on a coffee table in the Library.

Anyone who truly loves games will be drawn into The 7th Guest by an irresistible force. Anyone who loves the haunted house genre of adventure games, or movies, will be in hog heaven.

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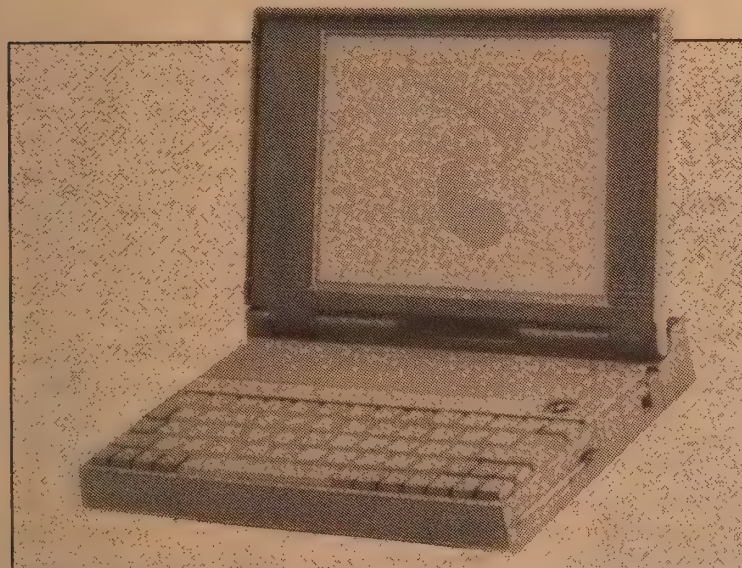
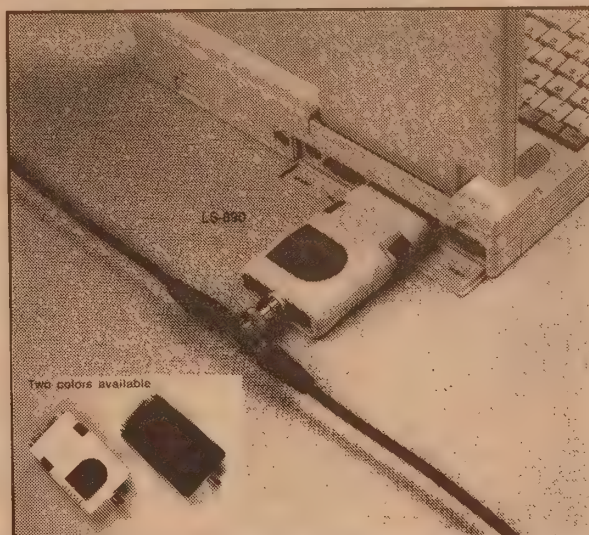
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The package includes two CDs. When used with a conventional audio CD player, the second CD also plays music from the game's sound track. There is also a short "behind-the-scenes" videotape about the making of The 7th Guest.

Graphics And Animation: 9
Music And Sound: 9
User Interface: 9
Overall Value: 9

The 42-page user manual includes extensive and detailed troubleshooting information; the thicket of incompatibilities that can prevent these things from working goes far toward explaining diehard customer resistance to CD-ROM technology on the MS-DOS side of town.

A package sticker warns that "This product contains scenes of graphic violence and pure evil which may offend some users."

Yeah, right. And if you play the CD backwards, you can hear Richard Branson and Bill Gates telling kids to worship Satan. (Virgin Games, Inc., 18601 Fitch Ave., Irvine, CA 92714. 714-833-8710; Sales: 1-800-874-4607)

SCANNER HARDWARE REVIEW

READSTATION OCR SYSTEM

Manufactured By: UMAX Technologies
Reviewed By: Michael Robin

The brochure from UMAX describes the ReadStation as "an integrated, standalone optical character recognition device designed to be as easy as a fax machine." At first glance, this statement may read like the common techno-babble extolling the wonders of a new hi-tech machine. But after using the ReadStation for any length of time, this is an excellent description of a machine that offers many advantages for the individual, workgroup, or office that needs an efficient, flexible scanner for text documents.

The ReadStation is an ideal standalone, multi-platform scanner, producing files readable on PC, Macintosh, or UNIX-based

computers. Scanned documents are transferred on floppy disk, via the ReadStation's built-in 1.44. 3.5" disk drive. In a law office, for instance, the ReadStation works just as easily for the partners or clerks that won't touch anything but their hot, new 486's as for those dedicated Macintosh users. In its non-volatile memory, the ReadStation can hold up to six profiles of customized function settings. These profiles can be assigned to individual users, types of documents, as well as applications and computers to be used.

Complementing the standalone capability and built-in floppy drive is resident OCR (Optical Character Recognition) software—Caere Corporation's OmniPage. No longer will you have to go through a multi-step process of scanning a document, launching OCR software, converting a file, and then reading it in your word processor, spreadsheet or database. (And if your work is on a Mac, figuring out how you will get this to someone else's PC.) UMAX proudly claims to "convert text to digital form in any of sixteen popular word processing, spreadsheet, or database formats," and eleven languages, including English, Spanish, French, and German. In addition to ASCII for PC, Mac, and UNIX, these popular formats include dBASE, Excel, GSA Lotus 1-2-3, Navy DIF, Microsoft Word, MultiMate, WordPerfect, WordStar, XyWrite III as well as TIFF for graphic images.

Another nice capability of the ReadStation is that it will read and convert documents you have scanned elsewhere, when you were away from OCR software. It also lets you convert faxes you received via fax modem. Simply save them as TIFF files on a floppy, load the image to be scanned into the ReadStation. Once the file is in memory the ReadStation will convert it to text like any other document. (UMAX Technologies, Inc. 3353 Gateway Blvd., Fremont, CA. 1-800-562-0311)

BOOK REVIEW

CONCISE GUIDE TO WINDOWS 3.1

Written By: Kris Jamsa

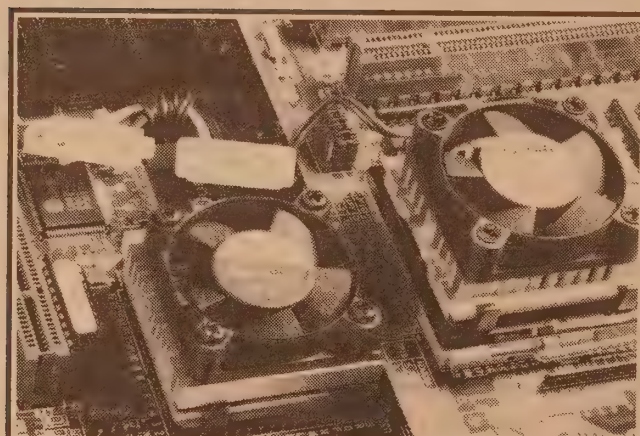
Published By: Microsoft Press

List Price: \$12.95

Reviewed By: Woody Liswood

Concise is correct. This short 208-page book gives you the lowdown on all the Windows defaults and customizations available through the standard Windows interface and programs.

Continued on page 230



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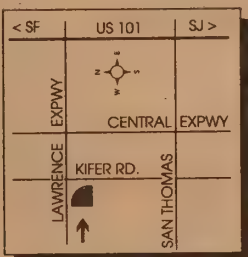
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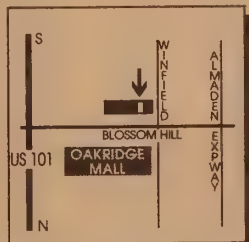
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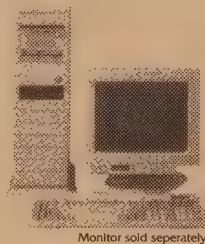
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CUSTOM SYSTEM SUPER SOURCE

ALEXIS 340 386DX-40MHz MINI TOWER SYSTEM



Monitor sold separately

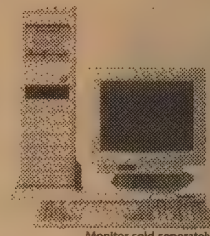
- ▶ AMD 386DX-40MHz
- ▶ 128K Cache (up to 256K)
- ▶ Mini Tower with 230W UL Power Supply
- ▶ TEAC Floppy Drive 1.2 or 1.44
- ▶ IDE Controller 2FD/2HD,
- ▶ I/O 2 Serial, 1 Parallel, 1 Game Port.
- ▶ 101 Mitsumi Keyboard
- ▶ Clock & Calendar
- ▶ OMB RAM (up to 32MB)

\$299

DOS 6.0 and Windows 3.1 add \$88

CUSTOMIZE TO YOUR NEEDS...

ALEXIS 440 486DLC-40MHz MED TOWER SYSTEM



Monitor sold separately

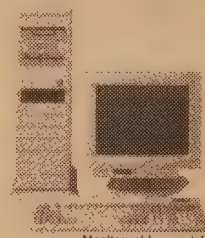
- ▶ CYRIX 486DLC40
- ▶ Math Co-Processor (optional add \$40)
- ▶ 8 Slots (6 16-Bit Slots, 2 8-Bit Slots)
- ▶ Opti Chip Set
- ▶ AMI Bios
- ▶ 128K Cache (up to 256)
- ▶ MEDIUM Tower with 235W UL Power Supply
- ▶ TEAC Floppy Drive 1.2 or 1.44
- ▶ IDE Controller 2FD/2HD
- ▶ I/O: 2 serial, 1 Parallel, 1 Game Port
- ▶ 101 Mitsumi Keyboard
- ▶ Clock & Calendar
- ▶ 0 RAM (up to 32MB)

\$449

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CUSTOMIZE TO YOUR NEEDS...

ALEXIS 452VL 486SLC2-50MHz VESA LOCAL BUS MED TOWER SYSTEM



Monitor sold separately

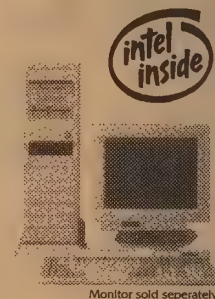
- ▶ ALARIS MotherBoard Manufactured by IBM
- ▶ IBM 486SLC 2/50MHz CPU
- ▶ 2 Local Bus 32-Bit Slots
- ▶ 7 16-bit slots, 1 8-bit slot
- ▶ 64K Cache (up to 128K)
- ▶ MEDIUM Tower with 235 UL Power Supply
- ▶ TEAC Floppy Drive 1.2 or 1.44
- ▶ IDE Controller 2FD/2HD,
- ▶ I/O 2 Serial, 1 Parallel, 1 Game Port.
- ▶ 101 Mitsumi Keyboard
- ▶ Clock & Calendar
- ▶ 0 RAM (up to 16MB)

\$529

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CUSTOMIZE TO YOUR NEEDS...

ALEXIS 433VL 486DX-33MHz VESA LOCAL BUS MED TOWER SYSTEM



Monitor sold separately

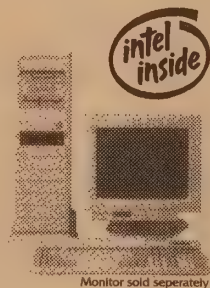
- ▶ Intel 486DX-33MHz
- ▶ ZIF Socket PENTIUM OverDrive Ready
- ▶ 2 Local Bus 32-Bit Slots
- ▶ 8 Slots 16bit
- ▶ 128K Cache (up to 256K)
- ▶ MEDIUM Tower with 235 UL Power Supply
- ▶ TEAC Floppy Drive 1.2 or 1.44
- ▶ IDE Controller 2FD/2HD,
- ▶ I/O 2 Serial, 1 Parallel, 1 Game Port.
- ▶ 101 Mitsumi Keyboard
- ▶ Clock & Calendar
- ▶ 0 RAM (up to 32MB)

\$599

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CUSTOMIZE TO YOUR NEEDS...

ALEXIS 450VL 486DX-50MHz VESA LOCAL BUS MED TOWER SYSTEM



Monitor sold separately

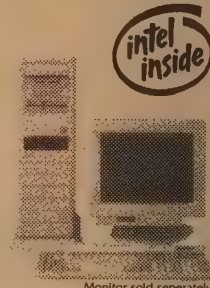
- ▶ Intel 486DX-50 MHz CPU
- ▶ ZIF Socket PENTIUM OverDrive Ready
- ▶ 2 Local Bus 32-Bit Slots
- ▶ 8 Slots 16bit
- ▶ 128K Cache (up to 256K)
- ▶ MEDIUM Tower with 235 UL Power Supply
- ▶ TEAC Floppy Drive 1.2 or 1.44
- ▶ IDE Controller 2FD/2HD,
- ▶ I/O 2 Serial, 1 Parallel, 1 Game Port.
- ▶ 101 Mitsumi Keyboard
- ▶ Clock & Calendar
- ▶ 0 RAM (up to 32MB)

\$779

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ALEXIS 466VL 486DX/2-66MHz VESA LOCAL BUS MED TOWER SYSTEM



Monitor sold separately

- ▶ Intel 486DX2-66MHz
- ▶ ZIF Socket PENTIUM OverDrive Ready
- ▶ 2 Local Bus 32-Bit Slots
- ▶ 8 Slots 16bit
- ▶ 128K Cache (up to 256K)
- ▶ MEDIUM Tower with 235 UL Power Supply
- ▶ TEAC Floppy Drive 1.2 or 1.44
- ▶ IDE Controller 2FD/2HD,
- ▶ I/O 2 Serial, 1 Parallel, 1 Game Port.
- ▶ 101 Mitsumi Keyboard
- ▶ Clock & Calendar
- ▶ 0 RAM (up to 32MB)

\$859

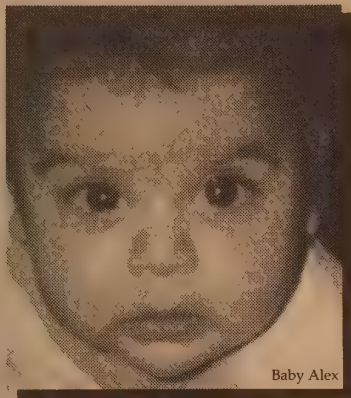
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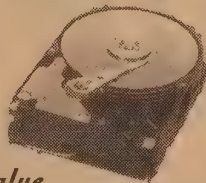
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CAPACITY	SPEED	SIZE	PRICE
105MB	13	3.5X1"	\$159



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IDE

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120MB	17	3.5X1"	\$169
250MB	15	3.5X1"	\$279

DEC

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1.6GB	3160S	3.5"	5400	9.5ms	\$1599	\$1739
2.0GB	5200S	FH	3600	12.5ms	\$1899	\$2099
3.5GB	5350S	FH	5400	11.5ms	\$3599	\$3799



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1.4GB	DK315C-14	5400	3.5"	FAST SCSI-2	\$2099	\$2199
1.5GB	DK516-15*	3600	FH	ESDI	\$2199	N/A
1.6GB	DK516C-16	3600	FH	SCSI-2	\$2199	\$2399
3.7GB	DK517-37	5400	FH	FAST SCSI-2	\$3999	\$4199

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CAPACITY	M/N	CACHE	SPEED	SIZE	PRICE
80MB	CP30084	64K	19ms	3.5X1"	\$164
120MB	CP30104H	32K	19ms	3.5X1"	\$179
170MB	CP30174E	64K	17ms	3.5X1"	\$199
212MB	CP30204	256K	12ms	3.5X1"	\$239
250MB	CP30254	64K	14ms	3.5"	\$269
540MB	CP30544	256K	<12ms	3.5X1"	\$669

SCSI

CAPACITY	M/N	CACHE	SPEED	SIZE	INTERNAL	EXTERNAL
80MB	CP30080	32K	19ms	3.5X1"	\$219	\$329
170MB	CP30170	64K	17ms	3.5X1"	\$249	\$359
212MB	CP30200	256K	12ms	3.5X1"	\$299	\$419
540MB	CP3540	256K	12ms	3.5X1"	\$839	\$949



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CAPACITY	M/N	CACHE	SPEED	SIZE	INTERNAL	EXTERNAL
1.2GB	C2247	256K	10ms	3.5"	\$1099	\$1229
1.2GB	C97558	256K	13ms	FH	\$1399	\$1599
1.8GB	C3009	256K	11.5ms	FH	\$2099	\$2299
2.0GB	C3010	256K	11.5ms	FH	\$2499	\$2699

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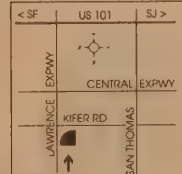
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160MB	GO160	32K	16ms		\$429
42MB	ELS42A	32K	19ms	3.5X1"	\$109
85MB	ELS85A	32K	17ms	3.5X1"	\$175
127MB	ELS127A	32K	17ms	3.5X1"	\$185
170MB	ELS170A	32K	17ms	3.5X1"	\$205
240MB	LPS240A	256K	Fast	3.5X1"	\$279
525MB	LPS525AT	256K	FAST	3.5X1"	\$749

FOR NOTEBOOKS

SCSI

CAPACITY	M/N	CACHE	SPEED	SIZE	INTERNAL	EXTERNAL
120MB	GO120S	32K	Fast		\$299	N/A
160MB	GO160S	32K	16ms		\$449	N/A
42MB	ELS42S	32K	19ms	3.5X1"	\$159	\$269
85MB	ELS85S	32K	17ms	3.5X1"	\$189	\$299
127MB	ELS127S	32K	17ms	3.5X1"	\$229	\$339
170MB	ELS170S	32K	17ms	3.5X1"	\$249	\$359
240MB	LPS240S	256K	Fast	3.5X1"	\$289	\$399
525MB	LPS525	256K	Fast	3.5X1"	\$749	\$859
700MB	PD700	256K	<10ms	3.5"	\$899	\$1019
1.0GB	PD1050S	512K	<10ms	3.5"	\$1099	\$1229
1.2GB	PD1225	512K	<10ms	3.5"	\$1169	\$1299

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107MB	ST3120	64K	15ms	3.5X1"	\$189
130MB	ST3144A	64K	15ms	3.5X1"	\$199
240MB	ST3283A	256K	12ms	3.5X1"	\$329
425MB	ST3550A	256K	12ms	3.5X1"	\$599
525MB	ST3600A	256K	10ms	3.5X1"	\$769

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CAPACITY	M/N	CACHE	SPEED	SIZE	INTERNAL	EXTERNAL
240MB	ST3283N	256K	12ms	3.5X1"	\$359	\$469
425MB	ST3550N	256K	12ms	3.5X1"	\$639	\$749
535MB	ST3610N	256K	10ms	3.5X1"	\$879	\$979
1.2GB	ST11200N	256K	10ms	3.5"	\$1089	\$1199
1.2GB	ST41200N	256K	14ms	FH	\$1089	\$1239
1.6GB	ELITE-I	X	11ms	FH	\$1799	\$1999
1.6GB	ST41651	256K	14ms	FH	\$1399	\$1599
1.7GB	ST11900N	256K	9ms	3.5"	\$1699	\$1829
2.1GB	ST42100N	256K	14ms	FH	\$1749	\$1959
2.4GB	ST12400N	256K	10ms	3.5"	\$1999	\$2129
2.4GB	ELITE-II	X	11ms	FH	\$2399	\$2599
3.4GB	ELITE-III	X	11ms	FH	\$2999	\$3199
3.4GB	ST43401N		Fast wide SCSI-II		\$3199	\$3399

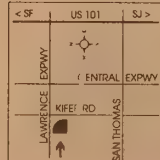
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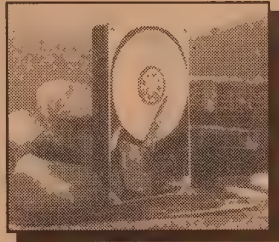
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128MB	25128A	32K	15ms	3.5"X1".....	\$299
130MB	7131A	64K	15ms	3.5"X1".....	\$189
213MB	7213A	64K	15ms	3.5"X1".....	\$229
245MB	7245A	64K	15ms	3.5".....	\$269
340MB	7345A	64K	15ms	3.5".....	\$339
540MB	MXT-540A	256K	8.5ms	3.5"X1".....	\$899

SCSI

	MODEL	CACHE	SPEED	SIZE	INTERNAL	EXTERNAL
120MB	7120S	64K	15ms	3.5"X1"	\$209.....	\$319
213MB	7213S	64K	15ms	3.5"X1"	\$269.....	\$379
340MB	7345S	64K	14ms	3.5"X1"	\$449.....	\$559
540MB	MXT-540	256K	8.5ms	3.5"X1"	\$859.....	\$969
1.2GB	MXT-1240	512K	8.5ms	3.5"	\$1239...	\$1349
1.2GB	PO-12S	256K	13ms	FH	\$999....	\$1199
1.7GB	P1-17S	256K	13ms	FH	\$1239...	\$1439

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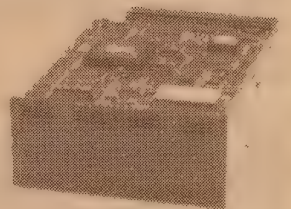
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	MODEL	CACHE	SPEED	SIZE	INTERNAL	EXTERNAL
425MB	M2623SA	240K	11ms	3.5"...	\$649....	\$759
520MB	M2624FA	240K	11ms	3.5"....	\$729....	\$839
1.2GB	M2694SA	256K	10ms	3.5"...	\$1099.	\$1229
1.2GB	M2266SA	256K	14ms	FH....	\$1099.	\$1299
2.0GB	M2652SA	256K	11ms	FH....	\$1899.	\$2099
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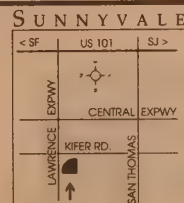


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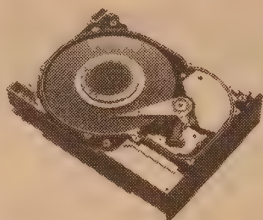
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1.5GB	MC1528	3600	15ms	FH	\$1399 ...	\$1599
2.0GB	MC1548	3600	14ms	FH	\$1849 ...	\$2049

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CAPACITY	M/N	RPM	SPEED	SIZE	INTERNAL	EXTERNAL
340MB	MC1684	3600	14ms	HH	\$1099 ...	\$1209
670MB	MC1624	3600	14ms	HH	\$999	\$1199

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1.6GB	MC1908	5400	11ms	FH	\$1849 ...	\$2049
2.4GB	MC1924	5400	11ms	FH	\$2399 ...	\$2599
3.6GB	MC1936	5400	11ms	FH	\$3199 ...	\$3399

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- <15MS SEEK TIME
- 2-YR WARRANTY

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- 64K CACHE
- 12MS SEEK TIME
- 2-YR WARRANTY

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- 14MS SEEK TIME
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340MB

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- 12MS SEEK TIME
- 3-YR WARRANTY

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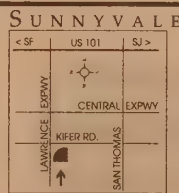


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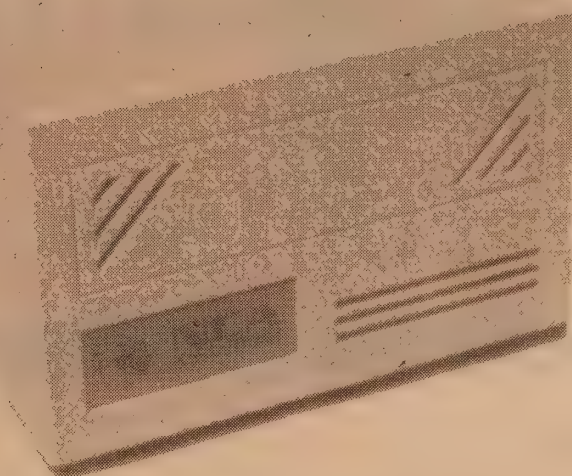
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NCA's **BARRACUDA I**

Half Height Enclosures
3.5" Fixed SCSI Disk Drives

SIZE	MAKE	SPEED	WARRANTY	PRICE
Formatted				
42Mb	Quantum	19ms	2Yr	\$269
85Mb	Quantum	17ms	2Yr	\$299
120Mb	Maxtor	15ms	1Yr	\$319
127Mb	Quantum	17ms	2Yr	\$339
170Mb	Quantum	17ms	2Yr	\$359
212Mb	Conner	12ms	1Yr	\$219
213Mb	Maxtor	15ms	1Yr	\$379
240Mb	Quantum	Fast	2Yr	\$399
240Mb	Seagate	12ms	1Yr	\$469
340Mb	Maxtor	15ms	1Yr	\$559
425Mb	Seagate	10ms	1Yr	\$749
425Mb	Fujitsu	12ms	5Yr	\$759
520Mb	Fujitsu	12ms	5Yr	\$839
525Mb	Quantum	Fast	2Yr	\$859
535Mb	Seagate	10ms	1Yr	\$979
540Mb	Maxtor	8.5ms	2Yr	\$969
540Mb	Conner	12ms	1Yr	\$949
877Mb	Toshiba	12ms	5Yr	\$1029
1.0Gb	Micropolis	10ms	5Yr	\$1199
1.0Gb	Seagate	10ms	5Yr	\$1199
1.0Gb	HP	10ms	5Yr	\$1229
1.0Gb	DEC	9ms	5Yr	\$1329
1.0Gb	Fujitsu	10ms	5Yr	\$1229
1.2Gb	Quantum	12ms	5Yr	\$1299
1.2Gb	Maxtor	8.5ms	3Yr	\$1349
1.2Gb	Toshiba	12ms	5Yr	\$1229
1.6Gb	DEC	9ms	5Yr	\$1739
1.6Gb	Seagate	8ms	5Yr	\$2039
1.7Gb	Micropolis	10ms	5Yr	\$2199
2.0Gb	Seagate	10ms	5Yr	\$2129
2.1Gb	Seagate	8ms	5Yr	\$2739

NCA's **BARRACUDA II**

Full Height Enclosures
FH Fixed SCSI Disk Drives

SIZE	MAKE	SPEED	WARRANTY	PRICE
Formatted				
1.0Gb	Micropolis	14ms	5Yr	\$1399
1.0Gb	Seagate	14ms	1Yr	\$1239
1.0Gb	Maxtor	13ms	2Yr	\$1199
1.0Gb	Fujitsu	14ms	5Yr	\$1299
1.3Gb	Micropolis	14ms	5Yr	\$1599
1.4Gb	Micropolis	11ms	5Yr	\$2049
1.4Gb	Seagate	11ms	1Yr	\$1999
1.4Gb	Seagate	14ms	1Yr	\$1599
1.5Gb	Maxtor	13ms	2Yr	\$1439
1.7Gb	Micropolis	14ms	5Yr	\$2049
1.7Gb	Fujitsu	11ms	5Yr	\$2099
1.7Gb	HP	11.5ms	5Yr	\$2299
1.8Gb	Seagate	14ms	5Yr	\$1959
2.0Gb	Seagate	11ms	5Yr	\$2129
2.0Gb	Micropolis	11ms	5Yr	\$2599
2.0Gb	Fujitsu	11ms	5Yr	\$2299
2.0Gb	HP	11.5ms	5Yr	\$2699
2.0Gb	DEC	12ms	5Yr	\$2099
2.8Gb	Micropolis	11ms	5Yr	\$3399
2.8Gb	Seagate	11ms	5Yr	\$3199
3.5Gb	DEC	11.5ms	5Yr	\$3799

Combo SCSI Devices
Custom Configurations
Available

NCA's **BARRACUDA III**

External
Non-Fixed SCSI Devices

SCSI BACKUP:

SIZE(UPTO)	MAKE	MODEL	TYPE	PRICE
250Mb	Archive	2150S	1/4"	\$499
525Mb	Archive	2525S	1/4"	\$699
1.3Gb	Archive	2750S	1/4"	\$899
2.0Gb	Archive	4540NT	4mm	\$1199
4.0Gb	Archive	4324NT	4mm	\$1299
8.0Gb	Archive	4542NT	4mm	\$1299
2.2Gb	Exabyte	EXB8200	8mm	\$1849
2.2Gb	Exabyte	EXB8205	8mm	\$1849
5.0Gb	Exabyte	EXB8500	8mm	\$2849
5.0Gb	Exabyte	EXB8505	8mm	\$2799
2.0Gb	HP	35470	4mm	\$1199
8.0Gb	HP	35480	4mm	\$1249
2.0Gb	WangDat	3100	4mm	\$1249
8.0Gb	WangDat	3200	4mm	\$1299

MAC Backup Software add \$ 79

NovaBack for PC add \$ 99

NovaNet for 100+users add\$499

EXTERNAL SCSI CD ROMs:

MAKE	MODEL	ACCESS	TRANSFER	PRICE
TOSHIBA	3401B	200ms	330KB	\$559
NEC	84-1	265ms	330Kb	\$569
PANASONIC	532	290ms	200Kb	\$459
CHINON	535	280ms	300Kb	\$499
TECEL	5024	265ms	300Kb	\$449
PIONEER	604X	300ms	612Kb	\$1249

Also Available:

External OPTICALS & Removable Cartridges by:
Syquest, Bernoulli, Maxoptix, Fujitsu, Ricoh
(See Page 20)

Your Hard Drive, Multimedia, & System Super Source



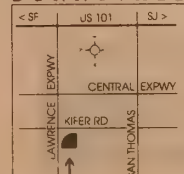
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Computer Products

POS VISA MasterCard DISCOVER AMERICAN EXPRESS

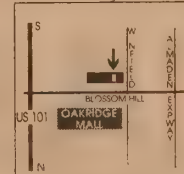
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SAN JOSE



962 Blossom Hill Rd. (X-Winfield, across of Oakridge Mall)
Mon-Sat 10am-7pm; Sun 11am-6pm

Corporate, Dealer,
Government, Educational,
& International Accts:

PHONE

(408) 522-8672

P.O FAX

(408) 739-2420

OPTICALS SUPER SOURCE

Finally... NCA is Making
128MB, 3.5", Rewritable Optical Drives
Affordable

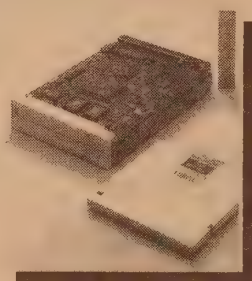
Optical Advantage

- ▶ 128MB Removable Optical Diskette
- ▶ 3.5" Diskette Size of Floppy
- ▶ Unlimited Storage
- ▶ Ideal For Data Mobility
- ▶ Fast Access time & Data Transfer
- ▶ ISO Standard

FUJITSU

FUJITSU 128MBYTE, 3.5" REWRITABLE OPTICAL

- ▶ 2511A
- ▶ Low Profile, only 1"
- ▶ Fast 30ms Seek Time
- ▶ 3600RPM
- ▶ 256K Cache



INTERNAL
\$859

EXTERNAL
WITH CARTRIDGE
\$1049

RICOH

RICOH 128MBYTE, 3.5" REWRITABLE OPTICAL

- ▶ Shielded case
- ▶ 3000 RPM
- ▶ 256K Cache
- ▶ Approx. 40ms seek time
- ▶ SCSI-II



INTERNAL
\$799

EXTERNAL
WITH CARTRIDGE
\$949

Panasonic

Office Automation

PANASONIC 128MBYTE, 3.5" REWRITABLE OPTICAL

- ▶ 3000 RPM
- ▶ 3.5" Half Height
- ▶ 40ms Seek Time



INTERNAL
\$849

EXTERNAL
WITH CARTRIDGE
\$999

TEAC

TEAC 128MBYTE, 3.5" REWRITABLE OPTICAL

- ▶ 3000 RPM
- ▶ 3.5" Half Height
- ▶ 128K Cache
- ▶ 42ms Seek Time
- ▶ SCSI-II



INTERNAL
\$759

EXTERNAL
WITH CARTRIDGE
\$899

OPTICAL CARTRIDGES

CAPACITY	SINGLE	5-PACK
128MB RICOH	\$49	\$239
128MB SONY	\$42	\$199

Your Hard Drive, Multimedia, & System Super Source



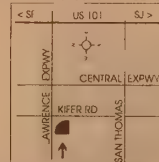
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REMOVABLE SUPER SOURCE

O P T I C A L S

Huge Sale
on
All 128MB 3.5"
Magnito Opticals
See previous page

Panasonic
Office Automation **OA**

Just In



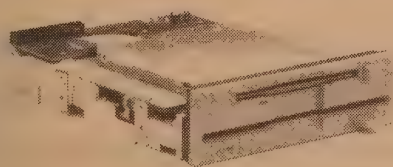
1GB External
5 1/4 Rewritable Multifunction
Optical Disk Drive

- ▶ Optical Head with no Magnet
- ▶ Max Transfer Rate 10Mbits/sec (Sync. 4MB/Sec)
- ▶ Ave seek < 90ms
- ▶ LIF-7010

\$2799

FLOPPY DRIVES

TEAC



FLOPPY DRIVES

DRIVE FORMAT	PRICE
1.2MB	\$57
1.44MB with 5.25" Kit	\$55
1.2/1.44MB Dual Floppy	\$149

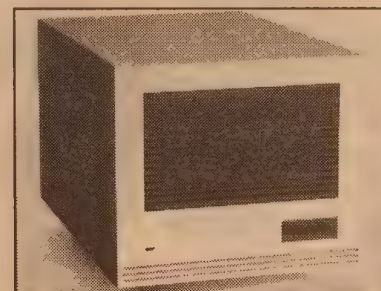
TOSHIBA

2.88MB TOSHIBA Floppy Drive \$68.00

Multifunction Magento-Optical Disk Drive for 1-Gbyte and 650-Mbyte Rewritable and WORM Disk Cartridges, With up to 4-Mbytes Read/Write cache

Maxoptix™

- ▶ Unlimited Data Storage
- ▶ External SCSI Subsystem
- ▶ One year factory warranty
- ▶ 25-Year life of Glass Media
- ▶ Embedded SCSI/SCSI-2
- ▶ Data Transfer of up to 13.2Mbit/Sec.
- ▶ Ultimate Back-up for NOVEL (Ready-to-Boot Backup)



TAHITI IIM - Multifunction

- ▶ 1MB Read/Write Cache
- ▶ External SCSI
- ▶ 35ms

\$2799

1GB CART.
glass/poly
\$199

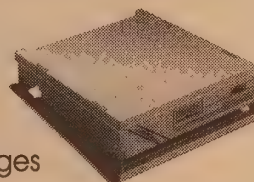
TAHITI IIM - Multifunction

- ▶ 4MB Read/Write Cache
- ▶ External SCSI
- ▶ 35ms

\$2999

REMOVABLES

BERNOULLI



- ▶ SCSI Interface
- ▶ Removable Cartridges
- ▶ 18ms Access time
- ▶ 150MB, 105MB, 65MB, 35MB Capacity

BERNOULLI Multi-Disk™ 150

PC Version

- ▶ Ext. Multi-Disk 150™
- ▶ 150MB Cartridge
- ▶ Controller & S/w

\$799

MAC Transportable

- ▶ Ext. Multi-Disk 150™
- ▶ 150MB Cartridge
- ▶ MAC Software

\$799

90MB BERNOULLI REMOVABLE
PC VERSION \$689 MAC Transportable .. \$529

BERNOULLI CARTRIDGES	SINGLE	3-PACK
65MB	\$79	\$219
90MB	\$159	\$439
105MB	\$109	\$289
150MB	\$159	\$429

FLOPTICALS

OMEGA®

21MB Floptical Drive



MAC Version

INCLUDES:

- ▶ External 3.5" 21MB Floptical
- ▶ One Floptical Media
- ▶ Cables
- ▶ Software for MAC

\$399

21MB MEDIA BY IOMEGA LASER ETCHED
SINGLE \$19.99 5-PACK \$89.99

PC Version

INCLUDES:

- ▶ IOMEGA 21MB 3.5" Floptical
- ▶ One Floptical Media
- ▶ Host adapter SCSI 8-bit
- ▶ Cables
- ▶ Software for PC

INTERNAL
\$369

EXTERNAL
\$429

21MB MEDIA BY IOMEGA LASER ETCHED
SINGLE \$19.99 5-PACK \$89.99

Your Hard Drive, Multimedia, & System Super Source

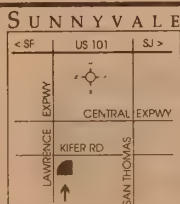


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SyQuest

TECHNOLOGY

SUPER SOURCE

- ▶ Removable Drive Cartridge, 44MB, 88MB, & 105MB
- ▶ Unlimited Storage
- ▶ 20ms Access speed (14ms on 105MB)
- ▶ SCSI Embedded
- ▶ For MAC or IBM
- ▶ 2 Year Warranty



SyQuest

TECHNOLOGY

INTERNAL 8-BIT KITS

EXTERNAL 8-BIT KITS

105MB, 3.5" DRIVE

105MB, 3.5" SCSI
High Performance
Removable

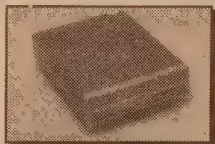
- ▶ 14.5ms
- ▶ 3.5"X1"
- ▶ Fits in floppy bay

\$489



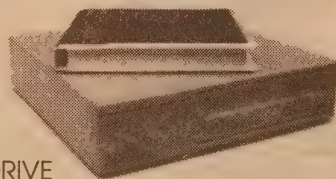
External SCSI with Cart. **\$689**

BARE DRIVES



44MB SQ555	\$269
88MB SQ5110	\$329
88MB C SQ5110C	\$399
READS & WRITES TO BOTH 44MB & 88MB CARTRIDGES	
105MB 3105S	\$489

EXTERNAL DRIVES



- ▶ EXTERNAL DRIVE
- ▶ CARTRIDGE
- ▶ STANDARD POWER CORD
- ▶ EXTERNAL CABLE
- ▶ INSTALLATION SOFTWARE (for Mac)

44MB SQ555	\$399
88MB SQ5110	\$499
88MB C SQ5110C	\$589
READS & WRITES TO BOTH 44MB & 88MB CARTRIDGES	
105MB 3105S	\$689

CARTRIDGES

Lifetime Warranty

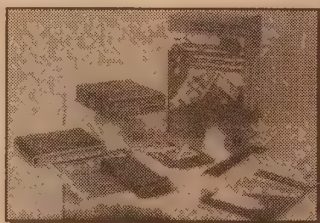
CARTRIDGE	SINGLE	5-PACK
44MB	\$65	\$309
88MB	\$99	\$489
105MB	\$99	\$489

8-BIT CONTROLLER & SOFTWARE ... \$59

- ▶ INTERNAL SYQUEST DRIVE
- ▶ CARTRIDGE
- ▶ 8-BIT SCSI CONTROLLER
- ▶ CABLES
- ▶ INSTALLATION SOFTWARE

44MB SQ555 Int. 8-BIT	\$379
88MB SQ5110 Int. 8-BIT	\$479
88MB C SQ5110C Int. 8-Bit	\$559
READS & WRITES TO BOTH 44MB & 88MB CARTRIDGES	
105MB 3105S Int. 8-Bit	\$649

INTERNAL 16-BIT KITS



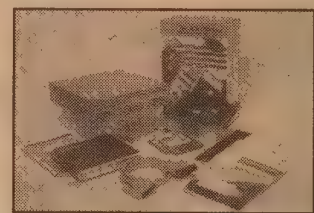
- ▶ INTERNAL SYQUEST DRIVE
- ▶ CARTRIDGE
- ▶ adaptec 1522 16-BIT SCSI CONTROLLER
- ▶ CABLES
- ▶ INSTALLATION SOFTWARE

44MB SQ555 Int. 16Bit	\$479
88MB SQ5110 Int. 16Bit	\$579
88MB C SQ5110C Int. 16Bit	\$649
READS & WRITES TO BOTH 44MB & 88MB CARTRIDGES	
105MB 3105 Int. 16-Bit	\$749

- ▶ EXTERNAL SYQUEST DRIVE
- ▶ CARTRIDGE
- ▶ 8-BIT SCSI CONTROLLER
- ▶ CABLES
- ▶ INSTALLATION SOFTWARE

44MB SQ555 Ext. 8-BIT	\$459
88MB SQ5110 Ext. 8-BIT	\$559
88MB C SQ5110C Ext. 8-Bit	\$639
READS & WRITES TO BOTH 44MB & 88MB CARTRIDGES	
105MB 3105S Ext. 8-Bit	\$729

EXTERNAL 16-BIT KITS



- ▶ EXTERNAL SYQUEST DRIVE
- ▶ CARTRIDGE
- ▶ adaptec 1522 16-BIT SCSI CONTROLLER
- ▶ CABLES
- ▶ INSTALLATION SOFTWARE

44MB SQ555 Ext. 16-Bit	\$559
88MB SQ5110 Ext. 16-Bit	\$659
88MB C SQ5110C Ext. 16-Bit	\$729
READS & WRITES TO BOTH 44MB & 88MB CARTRIDGES	
105MB 3105S Ext. 16-Bit	\$829

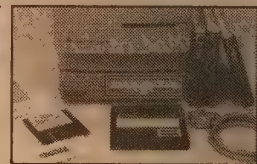
FOR ALL MACINTOSH MODELS*

Complete, Preformatted, Plug & Play External Kits.

- ▶ EXTERNAL SYQUEST DRIVE
- ▶ CARTRIDGE
- ▶ CABLES (choice of 50C-Mac or 50C-50C)
- ▶ STANDARD POWER CORD
- ▶ FORMATTING SOFTWARE (\$39 Value)

*Macintosh Plus or later

44MB SQ555	\$399
88MB SQ5110	\$499
88MB C SQ5110C	\$589
NEW! 105MB SQ3105	\$689

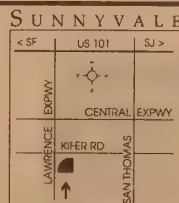


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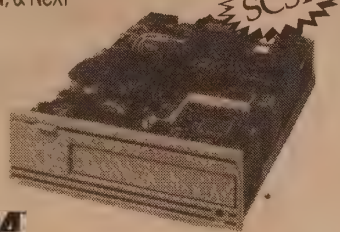
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Tape Back-Up Super Source

ARCHIVE

for IBM Compatibles, MAC, SUN, & NeXT



ANACONDA

- ◆ 36MB/MIN
- ◆ SCSI-2
- ◆ 1/4" TAPE UNIT

1.3GB 2750	2.0GB 2800
INTERNAL\$799	INTERNAL ...\$1099
EXTERNAL\$899	EXTERNAL ..\$1199

The BEST name in SCSI Back-up Drives

VIPER

2150		2525	
◆ 250MB VIPER		◆ 525MB VIPER	
◆ 6MB/MIN.		◆ 6MB/MIN.	
INT.	EXT.	INT.	EXT.
\$379	\$499	\$599	\$699

PYTHON

4324 TURBO PYTHON		4320NT	4542NT
◆ 4GB DAT 4mm		◆ 2.0GB DAT 4mm	◆ 4-8GB DAT 4mm
◆ 1MB Cache Buffer		◆ 11MB/MIN.	◆ 11MB/MIN.
INT.	EXT.	INT.	EXT.
\$1199	\$1299	\$1099	\$1199
			\$1199

EXABYTE®

SUN compatible 8mm SCSI back up system

SCSI-8mm/4mm

CAPACITY	MODEL	SIZE	INT.	EXT.
2.2GB 8mm	EXB-8200	FH	\$1549	\$1849
2.2GB 8mm	EXB8205	HH	\$1589	\$1849
5.0GB 8mm	EXB-8500	FH	\$2499	\$2849
5.0GB 8mm	EXB-8505	HH	\$2499	\$2799
2.0GB 4mm	EXB-4200	3.5"	\$999	\$1149
5.0Gb 4mm	EXB-4200c	3.5"	\$1099	\$1249



HEWLETT PACKARD

Setting the Standards

SCSI 4mm DAT

CAPACITY	MODEL	INT.	EXT.
2.0GB	35470 DAT	\$1099	\$1199
4-8GB	35480 DAT	\$1149	\$1299



WangDAT™

SCSI QIC-Format

CAPACITY	MODEL/TYPE	INT.	EXT.
250MB	5150 1/4" SCSI	\$429	\$529
525MB	5525 1/4" SCSI	\$599	\$699

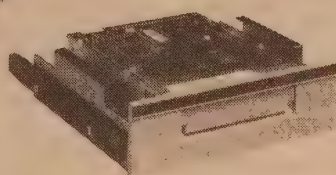
SCSI 4mm DAT

CAPACITY	MODEL/TYPE	INT.	EXT.
2.0GB	3100 DAT	\$1099	\$1249
4-8GB	3200 DAT	\$1199	\$1299

TAPE CARTRIDGES

Refer to page 20 of this Guide

COLORADO MEMORY SYSTEMS INC.



Uses DC2120 Tapes

RUNS OFF FLOPPY PORT

CAPACITY	MODEL/TYPE	INT.
120MB	DJ10/IBM COMPATIBLE	\$139
250MB	DJ20/IBM COMPATIBLE	\$189

EXTERNAL KIT WITH CARD AND CABLES KE-10	\$109
EXTERNAL TAPE PORT AB-11	\$39
FC-10 TAPE CONTROLLER, WITH CABLES	\$89
FC-15 HIGH PERFORMANCE 16-BIT CONTROLLER	\$189

Trakker



PARALLEL PRINTER PORT EXTERNAL TAPE BACK-UP SYSTEMS

RUNS OFF PARALLEL PRINTER PORT

CAPACITY	MODEL/TYPE	EXT.
120MB	TRAKKER 120	\$299
250MB	TRAKKER 250	\$389

BACKUP SOFTWARE

NovaStor

BEST BACK UP SOFTWARE

DESCRIPTION	PRICE
NovaBack for DOS	\$99
NovaBack for OS/2	\$149
NovaNet-Server Based Software (up to 100 users)	\$499
Sytos Plus™ for Adaptec	\$99

MicroSolutions Computer Products

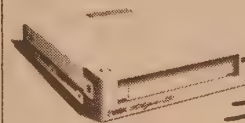
backpack

PARALLEL PORT 250MB EXTERNAL TAPE BACKUP



- ▶ QIC 80 Uses DC2120 Tape
- ▶ Software with Unattended Backups
- ▶ Twice as fast as internal tape

\$399



I-OMEGA

tape 250

RUNS OFF FLOPPY PORT

- ▶ 250MB Tape Back-up
- ▶ fits Standard 3.5" floppy bay
- ▶ Reads QIC Tape and Irwin tapes
- ▶ Central Point Software
- ▶ Windows Support

Tape 250 Insider

EXTERNAL
PC-POWERED..... **\$319** **\$189**

EXTERNAL TAPE 250 PARALLEL PORT\$429

IOMEGA 250MB Formatted tapes	
Single\$29	3Pack\$79

IRWIN

An Archive Company

RUNS OFF FLOPPY PORT

CAPACITY	MODEL/TYPE	INT.
120MB	ARC120	\$149
250MB	ARC250	\$189

PARALLEL PRINTER PORT EXTERNAL TAPE BACK-UP RUNS OFF PARALLEL PRINTER PORT

CAPACITY	MODEL/TYPE	EXT.
120MB	AccuTRAK 120	\$379
250MB	AccuTRAK 250	\$439

SUMMIT

MEMORY SYSTEMS INC.



WITH CENTRAL POINT BACKUP SOFTWARE

RUNS OFF FLOPPY PORT

CAPACITY	MODEL/TYPE	INT.
120MB	SE-120	\$149
250MB	SE-250	\$199
305	IDE TAPE BACKUP	\$279

Your Hard Drive, Multimedia, & System Super Source



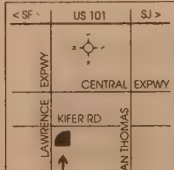
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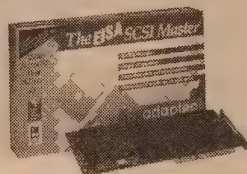
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SCSI CONTROLLERS

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SCSI CONTROLLERS

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TMC1680	16 BIT, 7HD/4FD KIT	\$239
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34F	VESA Local Bus Controller	\$279

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211	2HD/2FD W/2SERIAL, 1PAR, 1GAME	\$25
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222	2HD/2FD/UP TO 2.88MB WITH I/O	\$39
223	2HD/2FD for VESA LOCAL BUS I/O	\$59
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DC-200	CACHING (OMB, up to 16MB) 4HDs & 2FDs	\$99
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Increases Performance of IDE Drives,
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- 2 IDE HD
- 2 Parallel
- 4 Serial
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- 1 Game

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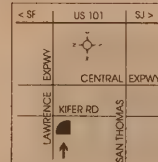
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4MBX9	70ns	9Chip	\$Call
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2MBX8	80ns	2Chip	\$Call
4MBX8	80ns	8Chip	\$Call
4MBX8	70ns	8Chip	\$Call
4MBX8	60ns	8Chip	\$Call
4MBX8	80ns	II-FX	\$Call
16MBX8	70ns	8Chip	\$Call

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32X8-15	\$17.00
32X8-12	\$39.00
64X4-25	\$8.50
64X4-20	\$9.00
64X4-15	\$18.00
64X1-20	\$5.75
64X1-15	\$6.75
8X8-25	\$3.75
8X8-20	\$3.25
8X8-15	\$4.75
16X4-20	\$6.25
16X4-25	\$4.75
16X4-15	\$8.25
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HP IIIsi

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Compaq PageMRQ Printers
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486DX-33MHz	\$329
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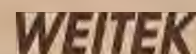
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83S87SX-33	\$79
83D87-16, 20, 25, 33	\$79
83D87-40	\$89



4167-25	\$359
4167-33	\$629



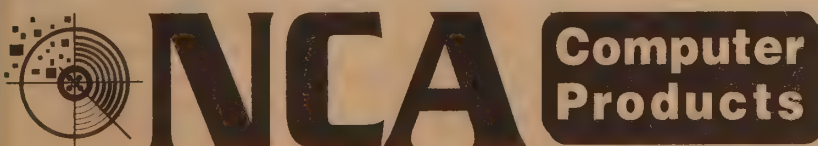
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High Quality,
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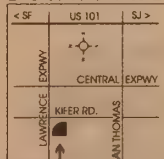
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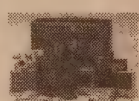


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- ▶ Multimedia Encyclopedia, Animals, & lemmings

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Sound Blaster Pro Deluxe	\$128
Sound Blaster 16 ASP	\$209
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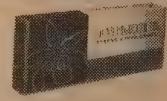
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- ▶ 9 Software Packages

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Maestro 16 (see pg. 19)\$179

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Wave Blaster	\$239



SOUND MAN 16

Advanced 20 Voice Stereo Synthesizer
16-Bit

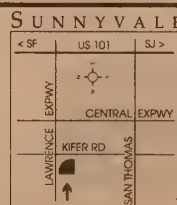
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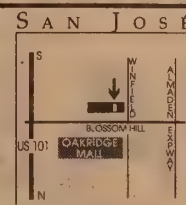


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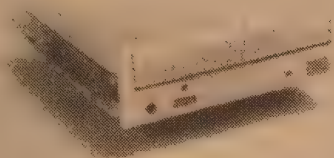
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XM-3401B

Fastest SCSI CD ROM Ever!!

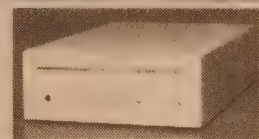


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Top of the line SCSI-II CD ROM



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(with card & software)

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\$429

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- ▶ INTERNAL W/ CADDY

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- ▶ DM-5024
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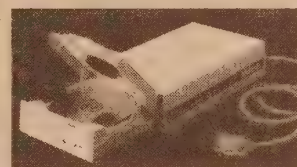
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backpack
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- ▶ Ideal for Notebooks
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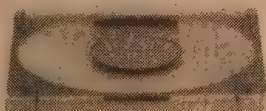
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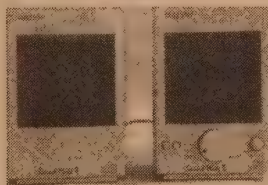
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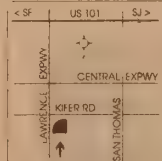
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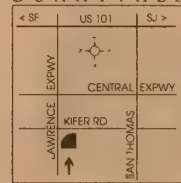
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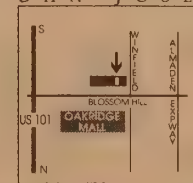
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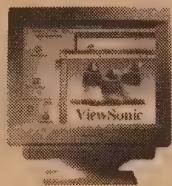
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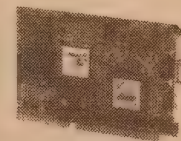
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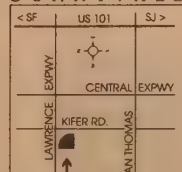
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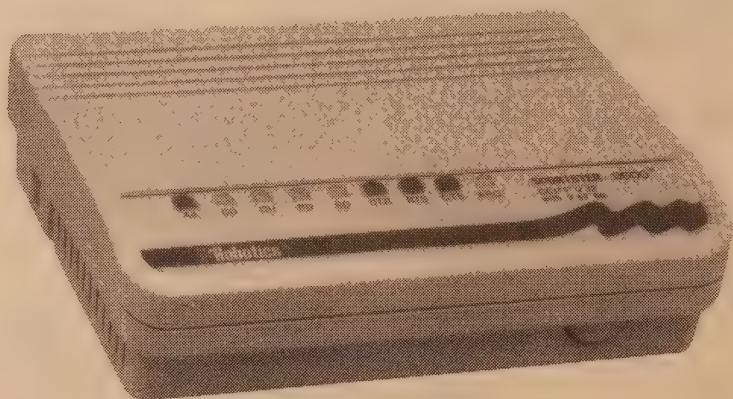
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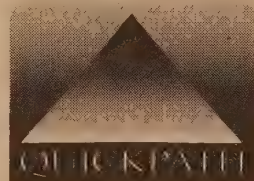
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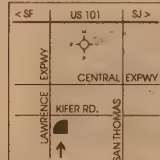
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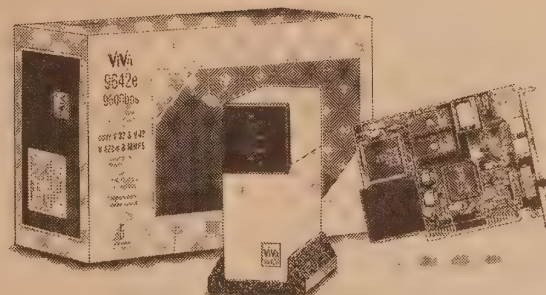


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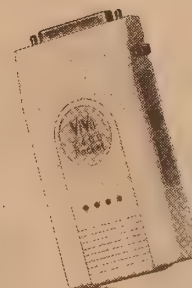
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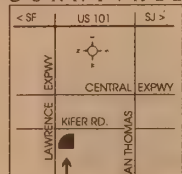
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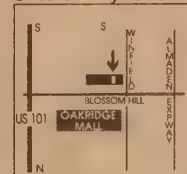
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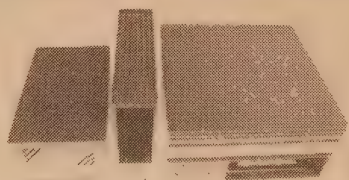
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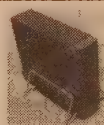


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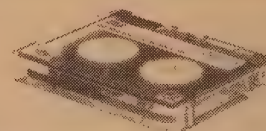
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RICOH 650MB	\$145	\$699

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KEYBOARDS

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MITSUMI BLACK	\$49.99
MAX STANDARD 101 KEY	\$19.99
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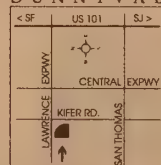
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MAC MEMORY INSTALLATION

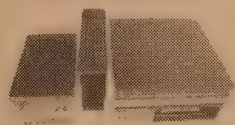
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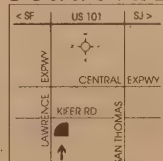
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BUSINESS SOLUTIONS

continued from page 46

about \$1 billion out of their own pockets for "travel to work" from home. In addition, the local governments in this area spend an additional \$110 million for employee "travel from work" to meetings held outside their respective governmental districts (usually related to agencies made up of more than one local government).

The same report discusses a series of

demonstrations with audio conferencing and computer conferencing which seem to show that substituting telecommuting for travel just to these intergovernment meetings could save about \$50 million per year. This level of savings would offset the cost of the required teleconferencing equipment in just three to six months!

During the coming year, the

Telecommunications For Clean Air Project will be running a "facilities sharing" demonstration project to investigate to what extent telecommuting can reduce the \$1 billion in private "travel to work" expenditures. Obviously, providing an environment in which employees substantially reduce their personal "travel to work" expenditures counts as an important employee benefit and may even help justify slower salary growth.

THE TELECOMMUTING ADVISORY COUNCIL ADOPTS A FORMAL ORGANIZATIONAL SCHEME

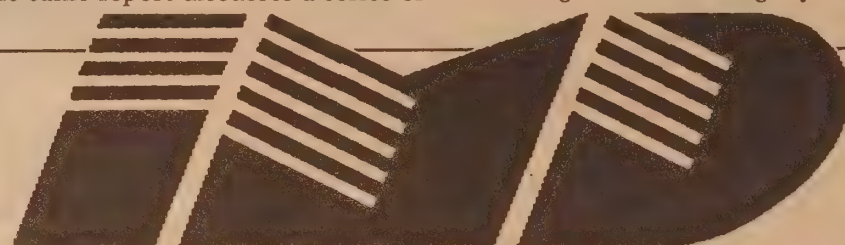
Long established as an ad hoc collection of telecommuting pioneers and proselytizers, the Telecommuting Advisory Council (TAC) has recently reorganized itself as a formal organization with tax-exempt status and—you guessed—annual dues.

With 129 paid-up members, so far, TAC is offering a vigorous program of formal and informal contacts between members, and opportunities for those interested in telecommuting to connect with experts in the field.

The current program calls for at least four national teleconferences, during which participants listen to reports from all over the US on the latest developments and most current projects in telecommuting. There will also be mailings of news notes, press clippings, and other informative readings. Some members are hoping to organize a face-to-face conference in 1994, to include formal presentations of white papers as well as panel discussions of topics of interest. There may also be regular sharing of information with the European Community Telework Forum.

Local chapters have been organized in Sacramento, San Francisco, Los Angeles, Orange County, San Diego, and other major metropolitan areas outside California, including Atlanta, Chicago, Denver, Minneapolis, the Mid-Atlantic region, Olympia/Puget Sound, and Phoenix. A few members are based in Australia, Canada, Japan, New Zealand, Norway, and the United Kingdom. This is truly an exciting and vibrant organization.

As early as August, TAC may sponsor an informal, two-day workshop on how-to issues related to telecommuting. For more information on any of this, fax an inquiry to: (310)476-6007. ■



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1M X 3-60	35
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256 X 9-70	11
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486SX-20 INTEL	127
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386DX-40 AMD	69
386DX-25 INTEL	49
386DX-25 AMD	47
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386SX-33 W/CPU	159

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PANASONIC KX-P4420, KX-P44501	
1MB BOARD	129
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4MB BOARD	229
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ISA			486-33 w/256K w/64K	390 370	560 540
486DX2-66 (3 Slots Local Bus) w/256K w/128K	678 658	848 828	386-40 w/128K	132	302
486DX-50 (3 Slots Local Bus) w/256K w/128K	603 583	773 753	386-33 w/128K	131	301
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486-50 w/256K	116
486-50 w/64K	94
486-33 w/256K	111
486-33 w/64K	88
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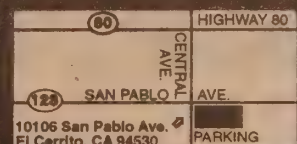
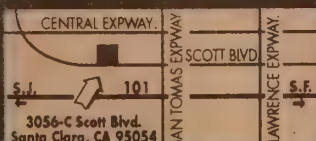
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Creative Lab Sound Blaster Card/Pro	\$98/198
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"It is this fundamental problem. I want to be accepted by the mainstream, but at the same time I find the mainstream boring. I want the rest of the world to discover Eastern Europe, but of course once they do, I'll be headed for the interior of Russia or something. It's like everything else, it keeps moving. Which of course is why it's interesting."

continued from page 82

of other people's intellectual property, which he's clearly not, he's a very principled guy.

Yeah. But he is living off MIT...

And doesn't see the conflict.

Exactly. And it's the same thing—people who say the Internet is free, it ain't free.

Everything gets paid for somehow.

So take my own newsletter—I'd very much like to put it up on AMIX and have it in smaller chunks. I'd like more people to read it. We're still trying to figure the pricing of it and all that.

On the other hand, it is mine—

And a lot of work goes into it.

Yeah. But I don't get emotionally upset if I see a Xerox of it around. [laughs] I once went to stay at a friend's house and I saw a Xerox of it on his kitchen counter and I just sort of put something on top of it. ... And in Eastern Europe, I pretty much say "Hey, do whatever you want with it."

But I can afford to do that because the other people do pay me for it. And I'd much rather have what I would consider a fairer system. Even people who pay for it and don't copy it, they probably don't read every issue because it's such an eclectic thing. I'd rather have somebody pay for it than not pay for it, but in the end if somebody genuinely can't afford it and they really would read it and so on and so forth, then I'd like them to read it. So I give a lot of them out free at trade shows.

Do you expect to be doing this forever?

No. No, but for the foreseeable future. I really like it.

My belief is that learning is adaptation; it's changing the model you have in your head. If you can't change your model you can't learn. Knowing is having a model; learning is being able to change your model in response to what you hear and see. And that's what I'm about—I keep changing my models, and going out and finding places that are just starting to create their models, like Eastern Europe or the new areas of the PC business or object-oriented programming or whatever.

If you asked me what I'm good at, I'd say that it's pattern recognition. My aunt was an interpreter and spoke eight languages. She could do simultaneous interpretation. You just have to have a nose for it. Partly I feel that I operate in this huge cloud, and there are all these different kinds of droplets in it. If a certain droplet goes by three or four times, you develop a sensitivity to it.

Then my job each month is to go out into this cloud and, do a self-organizing activity in my brain, make something with identity and with form out of what looked like a chaotic mass. Because there actually is a structure inside it if you can discover it.

What I keep hearing is that one of the key drivers behind all this is what you think is interesting. Is there a common denom-

inator to what you think is interesting?

No, it's kind of what I don't understand, and what other people don't understand, but it seems ready. When I first started in this business I would look for the expert, and now what I like is finding things where there is no expert, where you have to go to a lot of people.

Usually I've been thinking "This is a topic I should get to at some point" for five or six months. What I'm doing this month, for example, is meetings.

See, one of the wonderful things about my life is I don't have any meetings. I have meetings with vendors, and I go to large meetings, but I don't have the kind of meetings that make everybody groan, where every Monday morning you meet with the sales team.

I started going to some of these meetings by being on boards of things. I had a boyfriend once who told me that he really didn't understand sex until he went to bed with his second girlfriend. You can't separate the individual from the experience, but once you've had experiences with several individuals, or several boards, then you know what's generic and what's particular.

I was just kind of interested in this, and what made a meeting go well and what didn't. There's a bunch of these meeting-software companies which didn't really turn me on, because I didn't think you can replace it with software.

It was one of these things where these droplets were coming by and coming by, and then I had a lot of personal experience with meetings. So finally I just thought "Okay, I've got to understand this, I think it's important. People spend a lot of time in meetings."

Now I'm talking, for example, to the facilitator EFF uses, who is absolutely wonderful. Aside from being a wonderful facilitator, she's also a very smart woman. I'm going to see Ventana Corp. and probably Artisoft tomorrow; I've talked to two guys yesterday who are both doing meeting tools.

They sort of float in. And people who talked to you a year ago when you weren't ready, you remember them and you call them back. Then you ask people, who do you know, or what book did you read, and so you follow these tentacles.

If there's a hundred people, you need to talk to ten; in order to get the ten who are good enough, you need to talk to twenty, of which ten are the right ones. You don't need to talk to all hundred. But you need to talk to more than one or two; you need to triangulate and calibrate ideas and build a number of models.

What I try and do is make the topic concrete and figure out what are the structural dynamics of it.

For example, in a meeting, the smallest meeting is two people, or maybe somebody talking to himself. And the largest meeting is Bill Clinton talking to millions of people. And then in the middle there's the meetings where things really happen, where there's a lot of interaction but it's more complex than two people.

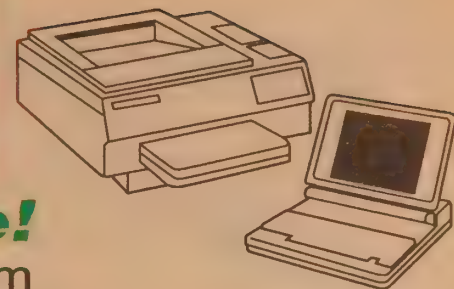
Another breakdown is, there's the intellectual content of the meeting, and the emotional, social. ... The intellectual content you can do very nicely with software, but the leadership, the motivation, the resolution of personal conflicts, is another part of it.

Another two axes are, there's the content of the meeting, both the emotional and the intellectual, and there's the process of the meeting.

And you need a lot of bandwidth for all that stuff.



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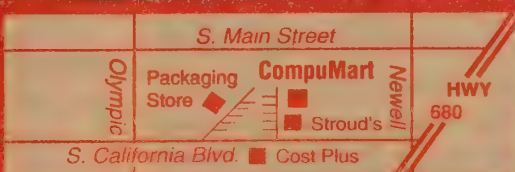
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Yeah. And to be a facilitator—this is sort of interesting. It's like you have to sacrifice a virgin every two years. Because when you start as a facilitator with a subject and a group you don't know, you're not very effective. As you begin to understand the content you become better at managing the process to focus on the content properly. So for a while you're really really good.

But then the problem is...

It eats you.

Yeah. Because first you walk in and you don't know who the jerks are and who the good guys are. Then you find out who they are, and you deal with them appropriately and you know how to shut the jerks up.

But you're not on the good guys' side. You're on the side of the content. But if you stick around too long, you inevitably develop your own ego, and...

So these are the kinds of things I'm discovering about the dynamics, and I suspect a lot of it just can't be done in software, but I'm trying to make it clear what can be and what can't.

It's going to be really fun. So that's an example of how I do it.

When you meet with companies, what do you talk about?

As you can imagine, you talk to them, you try things out on them, you say, well, here's my thesis, what do you think? You listen to them talk about their own products. But what you really do is the creation of a model out of different conflicting pieces of data and different conflicting models.

Sometimes I feel as if I'm the marketing guy for these people. "Okay, so what's your positioning?"

And sometimes they haven't thought about it very much.

Precisely. That's what I try and do. For a field can self-organize itself, you need to have the parts of it interact. Within the community, the parts need to interact to create the community. You can't have a community of things that don't interact. A living thing is cells and stuff interacting. And then an interesting issue is how much your brain is neurons interacting and stuff.

What do you find interesting about the Eastern European thing?

It's the creation of a new market—intellectually it's all this Santa Fe Institute stuff about self-organizing systems.

Personally I like doing things where I can have impact, rather than helping someone increase their market share 2%, and where if I don't do it nobody else will, as opposed to where I'm replaceable by somebody else.

I just like watching it grow. I speak Russian, and I feel at home there. I like going somewhere where I have friends but I'm not known.

You don't have to go around being Esther Dyson.

Yeah, it's always more challenging to persuade someone to talk to you than to fend off people you don't really want to talk to who have heard you're famous and want to bother you.

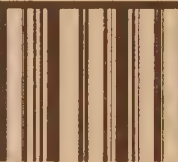
But it's more—in the US you have to be competitive in the sense of "Are you being included? Who gets to be the keynote speaker here, there, and everywhere else?" And at some point you realize, "Gee, it's not that thrilling to be the keynote speaker."

Been there, done that...

In Hungary or somewhere, you go and you feel you're telling people something new that they haven't heard before and they're interested. It's just exciting to watch something start. This valley 20 years ago was the same, and now it is, in pockets, but there's more of a mainstream to fight off.

And whatever comes along has to exist in the context of what's already entrenched.

It is this fundamental problem. I want to be accepted by the mainstream, but at the same time I find the mainstream boring [laughs]. I want the rest of the world to discover Eastern Europe, but of course once they do, I'll be headed for the interior of Russia or something. It's like everything else, it keeps moving. Which of course is why it's interesting. ■



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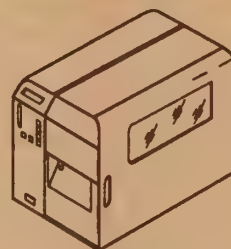
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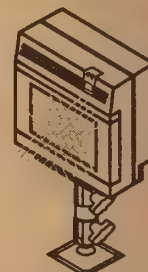
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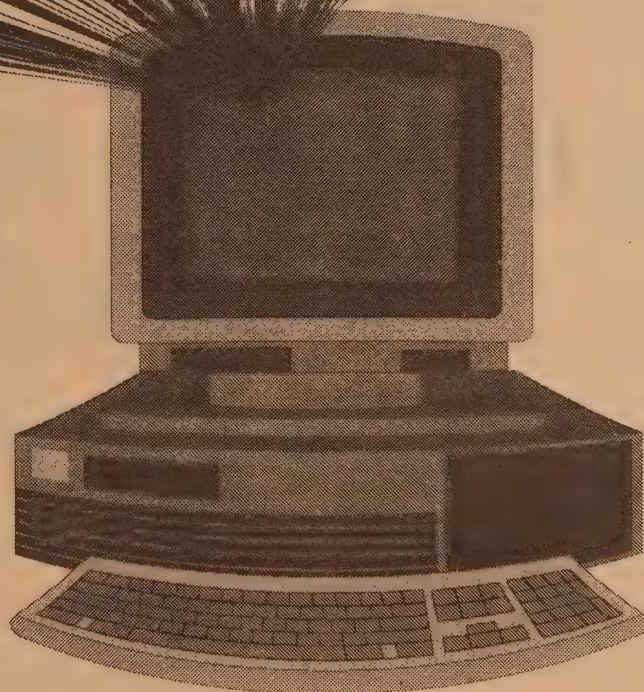
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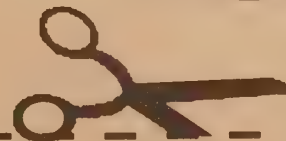
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partitions on the new drive, and use the released space (well over

have the full 160MB available for backup. Moreover, when I get a removable drive, I can repartition the 160MB for additional applications. ■ ■

(Although, as we shall see, there are quirks in adding removable drives.)

So one partition on the new drive will be 45MB for OS/2. But should the remaining 200MB form one partition for all applications? And what kind of partitions should there be on the new hard disk?

FAT VS. HPFS

One OS/2 advantage is that while it supports an improved version of DOS's File Allocation Table (FAT) file system, it also provides a new, much more sophisticated High Performance File System (HPFS). One major HPFS benefit is improved performance, which comes from optimizing the placement of the root directory on disk, using a B-tree to speed file searches, and reducing file fragmentation with variable size space allocation units. Another benefit is doing away with FAT's limitation of file name length to 8.3 characters. HPFS file names can be up to 254 characters long, and accept blanks. (Note: HPFS requires 500KB of memory, and it will not install if you have less than 6MB of memory in your computer.)

HPFS partitions, however, are not accessible to real DOS and DOS applications. You can, of course, access them with OS/2's DOS emulator. But, as I already mentioned, until you find and become comfortable with OS/2 substitutes for all your DOS utilities, giving up their read access to OS/2 partitions may prove inconvenient. Moreover, the performance advantage of HPFS over FAT tends to become significant in partitions larger than 128MB. This means that if you want multiple partitions to keep things rationally organized, you need a very large disk *and* large backup space. This is why a removable backup drive would be very useful, but note that the largest partition

It is risky to run OS/2 without a backup safety net, and a separate physical drive is preferable for this purpose.

you have should fit the size of the drive!

In my case, the maximum backup I will have initially is the 100MB released by applications on my old drive. Therefore, I opted for two 100MB application partitions in addition to the 45MB for OS/2. I will make the OS/2 partition and one 100MB application partition FAT, which real DOS can access. On the last partition I intend to install IBM's DB2/2 DBMS (and, perhaps, other OS/2 DBMSs). Since access by real DOS is not that critical, but less fragmentation and better performance is, I will make that partition HPFS. I will, therefore, end up with the following:

This preserves on D: the 1MB special partition for Boot Manager, the OS/2 facility that lets you choose the operating system you want each time you boot. Initially this will mean DOS, OS/2 2.0, and OS/2 2.1.

I hope this configuration will prove acceptable so that next month I'll be able to take on installation. ■

Fabian Pascal is a Palo Alto independent consultant, teacher and writer specializing in relational database management, OS/2 and office and portable computing. An industry analyst, he teaches seminars, consults, and has published extensively. His second book, Understanding Relational Databases, is forthcoming from John Wiley. You can reach him on MCI Mail (FPascal), CompuServe (736777,3306), and at 415-325-0646 (voice).

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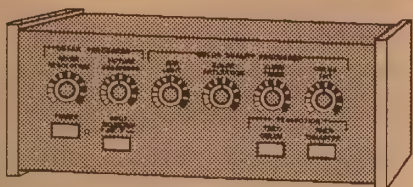
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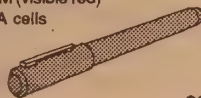
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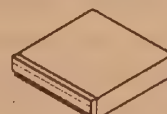
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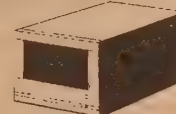
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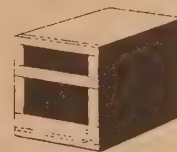
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B. SKHD1/Open	55W P.S., Same as above, but with 5.25" front opening	10" x 10" x 2.25"	\$99.95
C. SLHD2	60W P.S., Front opening for two half-height drives.	7.5" x 12" x 6.5"	\$119.95
D. SLHD3	60W P.S., Front openings for three half height drives	7.5" x 12" x 9"	\$139.95



Style "A", "B"



Style "C"



Style "D"

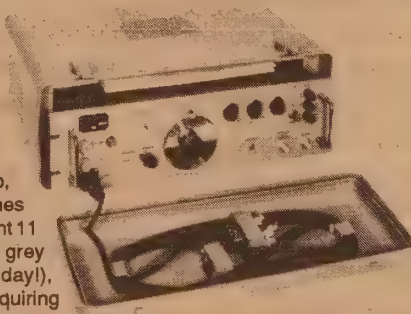
Neat Box you can have three ways!

This is the type of deal we love to offer our customers, because it has so much potential. We bought these items for the neat case, but then discovered that the unit inside has a wealth of possibilities. We offer some suggestions, let your imaginations run wild!

Option #1 -- Weathertight Equipment Case will accept a 19" standard rack-mount unit up to 5" high (with standard 5.25" front panel) and 11" deep. Gasketed front cover has cable storage clips, case has storage slot for .5" thick manual above unit. Outside dimensions are 20" x 7" x 15" deep, exclusive of rubber feet, four sturdy latches and spring-loaded carry handle. Weight 11 lbs. Constructed of aluminum, Navy grey color. Perfect for ham gear (field day!), instrumentation, or other projects requiring rugged, weathertight Mil-spec. case.

HSC# 14032

\$29.95



Option #2 -- Frequency Converter Unit (removed from case above) Mod. CV-2353/U was used to mix external signals from 100 Hz to 2 MHz with an external oscillator signal for output to a spectrum analyzer. It also has a 3 MHz signal source that may be applied to the spectrum analyzer. We weren't too excited about this unit until we noted the high quality of construction of several nifty RF modules inside. It uses 115 VAC, has a balanced mixer, a ultra-stable VFO (2.985 - 3 MHz) with a beautifully clean sine-wave output, 600Ω step attenuator, stable -15 VDC power supply, and a 2.5 MHz IF amplifier module. We tested one, and after warmup the VFO drifted only 25 Hz! You could add a crystal oscillator and use the balanced mixer for a QRP Transmitter, or add a detector and modify the VFO for the desired band and have a HF receiver, use as a stable signal generator for HF, or you could add frequency multiplier stages for a stable VHF RF source, etc. Includes power cable, three BNC cables, manual w/ schematic. Unused!

HSC# 14033

\$19.95

Option #3 -- Buy both units above, only \$44.95! What a deal!

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RGN91002A	BNC to BNC, RG58A/U Coaxial Cable, 50Ω	25 ft.	\$9.95
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DATA-2006	RJ45 to RJ45, Twisted Pair	6 ft.	\$3.39
DATA-2010	RJ45 to RJ45, Twisted Pair	10 ft.	\$3.99

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CTJ90165	Telephone cable, 6 conductor (flat)	\$06/ft	\$39.95/1000'
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977B	BNC Female for RG58, Twist-on	\$1.69
974B	BNC Male for RG58, Crimp-on	\$1.36
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991B	BNC Male for RG58, Twist-on	\$1.49
959NPB	BNC Adaptor, Female to Female	\$2.69
976B	BNC Adaptor, Male to Male	\$1.98
956NPB	BNC Adaptor, one Male to two Females "Tee"	\$2.69
981NPB	BNC Adaptor, all Female "Tee"	\$2.69
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Zhuyin keyboard for this input method. A second alternative is to use the built-in English-Chinese dictionary. The dictionary recognizes over five thousand English words and phrases, any of which can be entered into the "in-put" buffer. The "selection" buffer then offers the available choices. Other entry methods are more technical, including systems based on standard Chinese numerical codes for characters and others based on the structure of the characters themselves.

You can access TwinBridge's built-in dictionary of over fifty thousand Chinese phrases of two to four characters through any of these options. In the two phonetic options, Pinyin and Zhuyin, you simply enter the first letter of the second word, and the program will automatically list the dictionary options in the "selection" buffer.

Initially, Twinbridge arranges characters and phrases in the "selection" buffer according to general patterns of usage. In transliterations with dozens of possibilities, you may have to toggle through multiple lists in the "selection" buffer to find the character or phrase you want. As you make your selections, however, TwinBridge rearranges the entries according to your own usage patterns. Thus TwinBridge increasingly reflects your own needs, and you can use it with increasing speed. Your most recent selection always is the first character or phrase listed.

Japanese, Cyrillic and Greek, like Zhuyin, are each dependent on their own keyboard settings. Kana are entered according to the standard Japanese keyboard layout. Cyrillic and Greek are both arranged according to the standard IBM-PC layout. All three are entered directly into your document without using the "selection" buffer.

One of the most valuable options of TwinBridge is the "automatic blank space function." Because TwinBridge enters all characters, including Japanese kana and the Cyrillic and Greek alphabets, across two spaces, it is possible to split a character in half at the end of a line. This optional function adds a blank space between characters. By invoking it, you can avoid having half an entry wrapping around at the end of a line of text. If there is a single space remaining on a line, the blank space automatically fills it and forces the next character to wrap completely around to the next line. Although this function is optional and can be turned off, using it helps avoid massive editing headaches that can result when half of a character is stranded on the preceding line.

OPTIONS

TwinBridge 3.1A is available in a range of configurations. At the low end of the spectrum is the two-font Basic package. This allows for input in both simplified and traditional Song-font, as well as Japanese, Russian, and Greek. The Basic package, which is also available in five- (traditional Song-, Fang-, Kai-, and Bold-fonts and simplified Song-font) and eight-font (traditional and simplified variants of Song-, Fang-, Kai- and Bold-fonts) versions, prints in 24 x 24 bitmap fonts; it ranges in price from \$149-\$399.

The more expensive Professional package, which comes in the same range of font options, prints in 256 x 256 outline fonts, resulting in a significantly cleaner output on both dot matrix and laser printers. The Professional package ranges in price from \$399 for the two-font option to \$749 for the full eight-font combination of traditional and simplified characters; this review is based on the five-font Professional package, which retails for \$599. All configurations are dependent on a copy-protected key disk, which must be loaded as you load Windows, or TwinBridge will not operate. Once Windows is fully loaded, the disk can be removed.

The program can also be enhanced by two supplemental programs: Dictionary Manager, which allows you to add your own phrases to the fifty thousand-plus included in the built-in phrase dictionary; and Font Editor, with which you can build additional characters beyond the original seven thousand-plus by a cut-and-paste process. Neither comes with any of the standard packages, and neither has been reviewed. Both cost \$59.

TwinBridge 3.1A characters are clear and easy to read:

Traditional Song font (14 point):	漢語
Traditional Fang-Song font (14point):	漢語
Traditional Kai font (14 point):	漢語
Traditional Bold font (14 point):	漢語
Simplified Song font (14 point):	汉语

The range of possible size depends on the printer one uses. The program will support characters as small as 4 point and as large as 85 point.

All TwinBridge 3.1A packages require at least a 286 system. Because TwinBridge actually works as part of the application program, it reacts virtually instantaneously to your keyboard entries; more advanced CPUs do not make its response perceptibly more rapid. To run the TwinBridge Basic package requires at least 1MB RAM; the

**You can
compose
documents
entirely in
any of
TwinBridge's
multi-lingual
formats
without
leaving your
application
program.**

Professional package requires 2MB RAM. Your disk requirements will depend on how many fonts are in the version you choose: the Basic packages requires 3, 5, or 7MB for the three-, five- and seven-font versions respectively. Similarly, the Professional package requires 6, 12, or 18 MB, again depending on the number of fonts. All packages require Windows 3.0 or 3.1 (the manufacturer recommends 3.1 because of some minor compatability problems with 3.0). The program supports VGA, SVGA, XGA and paper white VGA monitors. TwinBridge works well with all graphics printers.

RECOMMENDATIONS

In comparison to alternative multilingual programs such as Guoqiao or Tianma, I have found that TwinBridge is a dream. It is quick to learn, easy to use, and the results are a joy to read. It is the solution that I, as a professional scholar and author, have long been looking for, to allow me to insert Chinese into documents. For those who need such a program, I give it my highest recommendation. ■

Hugh Clark is an associate professor of Chinese history at Ursinus College in Collegeville, PA.

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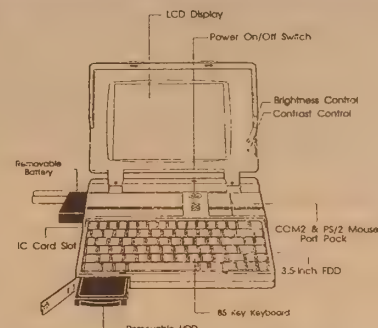
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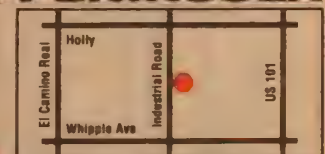
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| July 1 | We, <i>Human Envelopes 1.5</i> (address book); and another vendor's great product. |
| July 8 | To be announced. |
| July 15 | To be announced. |
| July 19 | BMUG South at United Way Office in San Jose. Bering, Disk Café (hard drive utility); and Great Plains Software Dynamics (accounting and business). |
| July 22 | To be announced. |
| July 28 | BMUG West at Exploratorium museum in San Francisco. We <i>Human Envelopes 1.5</i> (address book), and another vendor's great product. |

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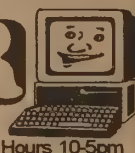
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continued from page 154

keting research applications. Using the system, one thousand personal computers are connected with information centers through the phone system. Since 1988, one company has conducted over one hundred different surveys of three thousand samples each. The company hopes to eventually replace the personal interview method of research with videotext research.

The major advantage of this system is that it is far less expensive than conducting in-person interviews. It will also be possible to collect larger samples than can be made in person. They hope to soon collect data from as many as ten thousand respondents, thus increasing the sample

size and decreasing the margin of error of the samples. With the current sample size, videotext samples need to be offset by other sampling methods. Videotext samples also reduce bias that may result from in-person interviews.

A disadvantage of the system is that videotext surveys must be shorter than those using other sampling methods. Users tire of entering responses on a keyboard, and open-ended questions are usually just left unanswered. Also, videotext sampling effectively excludes from the sample those who cannot afford a computer terminal.

EFFECTS ON OTHER MEDIA

An obvious question is: how will videotext affect the other mass media? Although differing opinions abound on this subject, time has shown that although videotext increases competition for the public's time and for advertising dollars, it doesn't pose a huge threat to other media.

Because it requires expensive equip-

ment and expertise, videotext cannot compete with an inexpensive color television or a fifty cent newspaper. But the cost of computer terminals is dropping rapidly—a home personal computer is well within the financial grasp of many families in the United States.

Electronic media will undoubtedly continue to intensify competition for advertising dollars, and will expand their share of the market. For now, though, the old standby media are in no danger of financial ruin from videotext.

Videotext is thriving. The pundits of a decade ago were wrong about the services available and the number of people using them. Business and the public have been slower to accept this new medium than we guessed. Businesses are just beginning to learn what videotext can do, what the public will accept, what advertisers want, and how to compete with other media. Perhaps in another decade or two, as more and more people plug in to the "global village" of computer networks, the public will begin to see videotext not as a convenience, but a necessity. ■

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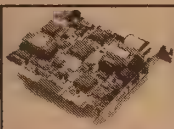
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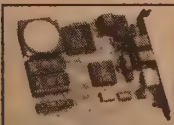
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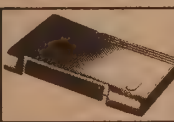


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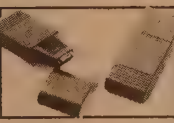


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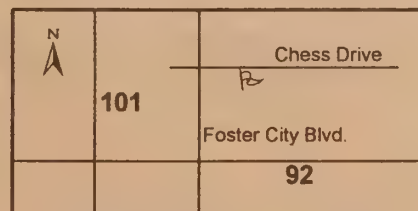
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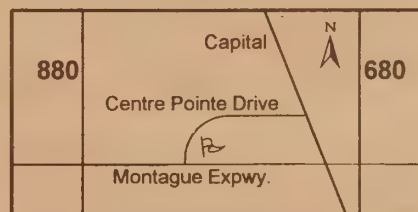
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Continued from page 190

This will help the beginner computerist, or neophyte Windows user. If you've been running Windows for some time, then you've probably already discovered 95% of the goodies covered by the book.

As you might expect, the *Concise Guide to Windows 3.1* starts with descriptions of the basic elements of a GUI (Graphic User Interface). The first section talks about using the mouse, selecting Windows, sizing, and moving or closing a window.

Also covered, in very basic detail, are the standard Windows applications such as the Program Manager, Print Manager, File Manager and Clipboard.

Jamsa does provide good details on the customization you can do through the Control Panel operations. In addition, there is a discussion of the basic applications that accompany Windows. And, lastly, a couple of pages are devoted to Minesweeper and Solitaire. However, it doesn't tell you how to cheat on either of these games.

Overall, this is a good introductory book; however, it is not really necessary for anyone who has used Windows for more than a week. (Microsoft Press, Inc., One Microsoft Way, Redmond, WA 98052-6399)

VOODOO MAC: TIPS AND TRICKS WITH AN ATTITUDE

By: Kay Yarborough Nelson

Published By: Ventana Press

List Price: \$21.95

Reviewed By: Mike Markowitz

Except, perhaps for the technical editors who are required to proofread them, Macintosh users take great pride in never reading manuals. Mac users learn their survival craft and lore through informal networks. Those unable to attend BMUG meetings or spend endless hours surfing cyberspace must fall back on the fourteenth century technology of print media. *Voodoo Mac* by Kay Yarborough Nelson shows how pleasant this can be.

As you would expect from Ventana Press, the publisher of *Looking Good in Print*, this is an attractive book, with body text in DTC Galliard Roman, chapter heads in Adobe Lithos, and gray-scaled screen shots.

Most of the tips, tricks, and traps in the book pertain to System 7, but there is also plenty to interest the dwindling number of System 6 diehards.

Chapters include:

- Secrets of the Finder
- Menu Magic
- Customizing Your Desktop
- Disk and Drive Tricks
- Printing Mysteries
- Connectivity Secrets
- Memory Demystified
- In Trouble?

There is an extensive list of "Easter Eggs," the little special effects and animations that programmers hide in their code to be revealed when you know the right keystrokes.

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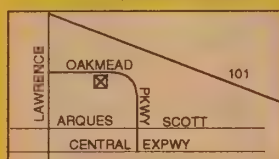
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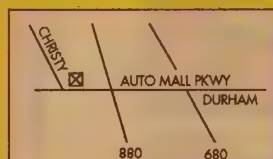
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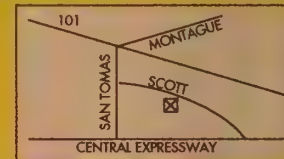
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Some of the tricks in the book require using ResEdit, the Swiss Army Knife of Mac programmers. But most are amazingly simple. This is the sort of book where the Mac-savvy reader is continually muttering, "aha!" or "gee whiz!" or "@#%\$^." For example:

[Tip] Use the Alarm Clock to set the time. You'll have to reset your Macintosh's internal clock twice a year for Daylight Savings Time. For the most accurate time, use the Alarm Clock desk accessory, not the General Controls control panel. Here's why: when you use the alarm clock, your change takes place instantly, but when you use the General Controls control panel, the time change doesn't take effect until you select another option, or close the control panel.

Voodoo Mac would be a great gift for a new Mac user. It is one of the few Mac books I've seen lately that earns a place of honor on the same shelf as *The Macintosh Bible*, (3rd edition) published by Peachpit Press.

HARD DRIVE

By: David Pogue

Published By: Diamond Books

List Price: \$4.99 (288 p., softcover)

Reviewed By: Mike Markowitz

Many novels have been written on a Macintosh, including works by best-selling author Tom Clancy and Nobel Prize winner Gabriel García Márquez. *Hard Drive*, a first novel by *MacWorld* contributing editor David Pogue, appears to be the first work of pulp fiction about the Macintosh.

Set in the very near future, the plot centers on a Silicon Valley software firm, Artelligence, in a frantic race to ship Voice Master, a breakthrough voice recognition product. If they miss another ship date, the Japanese investors will take over and sack the management team. The villain of the piece is an insidious file-devouring software virus. The cast of characters combine popular media perceptions of what programmers must be like, with some neatly crafted sketches of the actual folks you would meet in the booths at MacWorld Expo. Like Michelle, the blond, beautiful, kind-hearted, impeccably groomed, and under-appreciated PR person:

"As Michelle piloted her Civic out of the industrial park she had to utter three shuddering primal grunts before she recovered from the clammy sleaziness of the bindery guy." (page 157).

Much of the fun in reading *Hard Drive* is figuring out the real-world equivalents for all the fictitious names of Mac-related companies, programs, and products, like InfoServe, the popular online service; Freeform Pro, the drawing program; and SpinKing, the hard drive maker whose lubricant "gummed up after a year or so of heat and dust inside the computer."

The text is effectively illustrated with screen shots, dialog boxes and passages set in genuine Mac screen fonts. This sort of detail is rare in paperbacks—publishers hate anything that drives up production costs.

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Hard Drive lacks the sex and violence required for conversion to a viable Hollywood screenplay, but it has such great entertainment value to members of the Macintosh community that it should be animated for distribution on CD as a QuickTime movie. (Diamond Books, Berkeley Publishing Group, 200 Madison Ave., New York, NY 10016)

PC SOFTWARE REVIEW

WINSENSE

Published By: SoftLogic Solutions

List Price: \$89.95 (Introductory price: \$49.95)

Reviewed By: Woody Liswood

Does Windows act and run the way you want it to? Did you know that there are five "INI" files which contain, or can contain, settings that allow you to customize almost every aspect of your Windows environment?

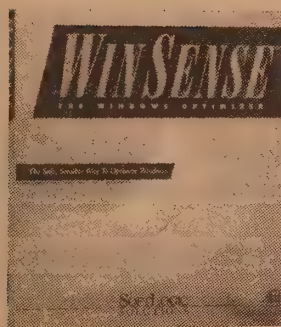
Much of what is customizable in those files can be

reached through the standard Windows commands and programs like Setup and the Control Panel. However, there are hundreds of potential customization commands which are not documented in the Windows documentation. It is reminiscent of the early WordStar customization capabilities that let you modify every aspect of the program so that it worked exactly as you wanted it to.

WinSense, a new program from SoftLogic, (the folks who originated the disk compression and defragmentation craze) contains all of the known (and some of the unknown or undocumented) control settings and descriptions of what they do. WinSense provides the capability to change and optimize over three hundred fifty different settings available through the Windows initialization files. In addition to appearance, you can customize all aspects of communication, startup, memory use, memory management, how DOS programs run under or in Windows, and even network performance.

WinSense works through a Windows interface and asks a couple of questions about how you work. With this information, WinSense lets you find your way through a variety of customization commands. You don't need to actually know the commands or what they mean. WinSense will display them one at a time, and in somewhat plain language, will tell you what each control does, what the normal default is, and what might happen when you make a change.

You can work your way through WinSense by subject, by the INI file the settings will appear in, or by the Windows program, such as the Program Manager, that will be affected by the command. Or, if you just have a quick question, WinSense contains an excellent help system.



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PRODUCT SPOTLIGHT

Lastly, WinSense contains a "Knowledge Base" that also provides detailed information on all of the changeable functions.

The documentation is light. It tells how to install the program—which must be done from DOS, and shows a couple of screens to let you know what to expect. Everything else must be done through WinSense itself. The DOS install is necessary, according to WinSense, so that it can look around and see what resources are available before Windows is running.

Nothing happens until you exit the program. And, just in case you don't like what you do, or what you do completely screws up your Windows, WinSense keeps track of your last five changes and lets you change back at a moment's notice.

If you use Windows, this is a *must* have program for your library. (SoftLogic Solutions, Inc., One Perimeter Rd., PO Box 4840, Manchester, NH 03108-4840. 1-800-272-9900)

MPC WIZARD—CD-ROM

Published By: Aris Entertainment

List Price: \$14.95

Reviewed By: Woody Liswood

MPC Wizard, is not, I repeat, is not a game. It is a CD-ROM-based collection of assorted tests to insure that your Multimedia PC is working, and includes samples of images and sound files available from other Aris products. Since this is an MPC product, it runs under Windows.

The MPC Wizard tests your CD-ROM data transfer speed, your ability to display 256 colors, and how well your sound board is working. These are the goodies which make up the MPC standard.

When I ran the CD-ROM test, I was told that my Sony 6211 CD-ROM drive did not meet the correct data transfer rate of 150 kilobytes per second, the minimum rate to insure correct animation and sound file response. Mine tested at 148 kps. Upon further



examination, it looked like the test bypasses the Lightning for CD-ROM disk cache. I'm not too worried, since I have never had any problem with sound files or animation sequences coming off any CD-ROM.

The Wizard also told me that my 256-color driver and sound board were OK. I use a Pro Audio Spectrum board. The MPC Wizard has updated collections of files for most of the popular sound and VGA cards. Surprisingly, after I installed the new driver I lost all sound. The new drivers had the wrong DMA and IRQ selections for my particular setup and quick change to the setup program solved everything.

The picture and sound collection from the Aris MediaClips ran without any problems. You can select an individual image, or just let the slide show take you through a series of fifty images and sound clips. Anything you like can be copied directly to your disk and used in any way you wish.

The images are displayed in two sizes, small and large. The large size looks like it was designed for an 800 x 600 display screen,

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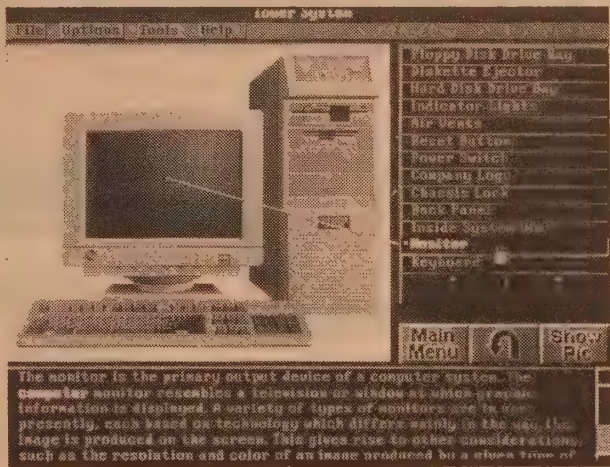
since it only took up about two-thirds of the screen on my 1023 x 768 display drivers. Visuals can be saved in small or large 8-bit BMP sizes, 8-bit PCX, or a 24-bit TIF format. I printed each of these sizes and found no real difference in the quality on my PostScript printer. (Aris Entertainment, Inc., 310 Washington Blvd., Suite 100, Marina Del Rey, CA 90292. 310/821-0234, 1-800-228-2747)

COMPUTER WORKS

Published By: Software Marketing Corp.
List Price: \$79.95
Reviewed By: Lenny Bailes

I have spent many hours exploring what makes PCs work, and have to admit I'm impressed by this software package from Software Marketing Corporation. It provides a graphic display of both ancient and modern computers as well as an accompanying text history. The HyperCard-like display features a topic list on the right accompanying an attractive set of color illustrations on the left.

The package provides a brief history of computing since the 19th Century. It also identifies the various components that make up PCs. There is some mention of Macintosh development, but the history and tutorial is mostly oriented toward MS-DOS PCs. A set of



icons at the bottom of the screen allows you to select a computer component or other related field of concern that will be displayed.

For PC owners who have the inclination to explore the machine's inner workings, this will be a helpful information source. I enjoyed looking at the color illustrations of various computers and historical computing devices. The pop-up index can be called to the screen to allow access to any of the program's online topics. The package provides interesting historical facts. I didn't know that the first hand-held calculator was invented by a man named Dorr Eugene Felt, but I learned this fact from the historical topic of Computer Works. This package may be useful as an introduction to PCs for secondary and college schoolteachers. It may also be useful as a training aid. A built-in quiz facility will query the student/trainee on the information introduced in the program. (Software Marketing Corp., 9830 S. 51st St., Bldg. A-131, Phoenix, AZ 85044. 602/893-3377) ■

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RESOURCES

Calendar Of Events

CONFERENCES, EXPOS, SHOWS, AND OTHER SPECIAL EVENTS

JUNE

June 27 The Computer Show & Sale. Hayward Centennial Hall. MarketPro. Call: (415)388-8893.

June 29 IICS Human Interface SIG Meeting. San Francisco. Medius IV. Call: (415)905-6959.

June 29-July 1 Mactivity '93: The Macintosh Connectivity Conference. San Jose. Winehouse Computer Company. Call: 1-800-798-2928.

JULY

July 10 Computer Show & Sale. Santa Clara Co. Fairgrounds. Richard James. Call: 1-800-685-1400.

July 11 Computer Show & Sale. Rancho Arroyo Sports Complex, Sacramento. Richard James. Call: 1-800-685-1400.

July 11 The Computer Show & Sale. Concord. MarketPro. Call: (415)388-8893.

July 17 Computer Show & Sale Featuring How To Buy, Build, Or Upgrade Your PC Seminar. Oakland Coliseum. Richard James. Call: 1-800-685-1400.

July 18 The Computer Show & Sale. Sacramento Scottish Rite Center. MarketPro. Call: (415)388-8893.

July 24 Computer Show & Sale. San Mateo Expo Center. Richard James. Call: 1-800-685-1400.

July 25 SFPC User Group Picnic In The Park. San Francisco. San Francisco PC User Group. Call: (415)386-5000.

July 25 The Computer Show & Sale. Hayward Centennial Hall. MarketPro. Call: (415)388-8893.

July 27 IICS Human Interface SIG Meeting. San Francisco. Medius IV. Call: (415)905-6959.

July 31-August 1 Computer Show & Sale Featuring How To Buy, Build, Or Upgrade Your PC Seminar. Cow Palace. Richard James. Call: 1-800-685-1400.

AUGUST 8, 1993

CALIFORNIA COMPUTER SHOW & SALE *Rancho Arroyo Sports Complex, Sacramento*

The California Computer Show & Sale is coming to the new Rancho Arroyo Sports Complex in Sacramento. This show features millions of dollars in brand new PC compatibles, hardware, software, and accessories. Admission is \$6.00 and the show is open from 10:00 am to 4:00 pm. The Sports Complex is located at 9880 Jackson Rd., E. Sacramento. For more information call: 1-800-685-1400.

JULY 21

STC JOINT MEETING OF THREE CHAPTERS *Berkeley*

The Society for Technical Communication is the world's largest and fastest growing professional organization for technical writers, editors, and other technical communicators. The STC provides a quarterly journal; local chapters hold monthly meetings with presentations on various topics and publish monthly newsletters. In July Berkeley, East Bay, and San Francisco chapters will have a joint dinner meeting in Berkeley. Reservations are necessary. Call: (510)466-5464.

TOP DATA MONTHLY SPECIALS

SYSTEM	MMB	BASIC	BASIC SYS	BASIC SYS	BASIC SYS	BASIC SYS	BASIC SYS	BASIC SYS	BASIC SYS	BASIC SYS	BASIC SYS	BASIC SYS
486DX2-66C VLB	579	739	949	1,049	1,079	1,129	1,159	1,299	1,329	1,369	1,399	
486DX-50C VLB	519	679	889	989	1,019	1,069	1,099	1,239	1,269	1,309	1,339	
486DX-33C VLB	379	539	749	849	879	929	959	1,099	1,129	1,169	1,199	
486DX-33C VLB	259	419	629	729	759	809	839	979	1,009	1,049	1,079	
386DX-33/64C VLB	199	359	569	669	699	749	779	919	949	989	1,019	
486DX2-66C EISA	629	789	999	1,099	1,129	1,179	1,209	1,349	1,379	1,419	1,449	
486DX-50C EISA	549	709	919	1,019	1,049	1,099	1,129	1,269	1,299	1,339	1,369	
486DX-33C EISA	429	589	799	899	929	979	1,009	1,149	1,179	1,219	1,249	
486DX2-66C ISA	549	709	919	1,019	1,049	1,099	1,129	1,269	1,299	1,339	1,369	
486DX-50C ISA	479	639	849	949	979	1,029	1,059	1,199	1,229	1,269	1,299	
486DX2-50C ISA	449	609	819	919	949	999	1,029	1,169	1,199	1,239	1,269	
486DX-33C ISA	329	489	699	799	829	879	909	1,049	1,079	1,119	1,149	
486SX-33C ISA	199	359	569	669	699	749	779	919	949	989	1,019	
486SX-25C ISA	159	319	529	629	659	709	739	879	909	949	979	
486DLC-40C ISA 87DLC-40 Inc'd	239	399	609	709	739	789	819	959	989	1,029	1,059	
486DLC-33C ISA	179	339	549	649	679	729	759	899	929	969	999	
486SLC-33C ISA	149	309	519	619	649	699	729	869	899	939	969	
486SLC-25C ISA	139	299	509	609	639	689	719	859	889	929	959	
386DX-40/64C ISA	119	279	489	589	619	669	699	839	869	909	939	
386SX-40C ISA	99	259	469	569	599	649	679	819	849	889	919	
386SX-33C ISA	79	239	449	549	579	629	659	799	829	869	899	
386SX-25C ISA	69	229	439	539	569	619	649	789	819	859	889	
286-12 ISA	59	219	429	529	559	609	639	779	809	849	879	

BASIC SYSTEMS: IDE & CPU. INCLUDES: 16MB (386SX/486SX) 16MB Memory, 100% Controller, 5.25/3.5" FDK, Volume Case, 100% Power Supply and Keyboard.

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40MB/80MB IDE.....109/149	14"SVGA .39 w/512K Card.....279	Texel SCSI CD-ROM Int.....399	IDE 4HD/2FD Cache(0K) VESA .3MS.....199
120MB IDE.....169	14"SVGA .28 w/1M Card.....319	Mitsumi CD-ROM Int.....199	IDE 2HD/2FD 2S1P1G VESA.....49
170MB IDE.....199	14"SVGA .28 NI w/1M Card.....349	Sony CDROM 31/541.209/399	IDE 2HD/2FD Cache(0K) ISA .3MS.....99
200MB IDE/SCSI.....229/329	14"SVGA .28 NI VESA 1M.....429	Sound Blaster Pro.....159	IDE 2HD/2FD 2S1P1G.....19
250MB IDE/SCSI.....269/369	15"SVGA .28 NI VESA 1M.....529	Mini Tower Case w/230w....49	MFM 2HD/2FD.....35
340MB IDE/SCSI.....339/419	Diamond Speed Star 24X.....159	Desk Top Case w/230w.....51	
540MB IDE/SCSI.....779/879	Diamond Stealth 24 w/1M.....169	Med Tower Case w/230w....79	
1GB SCSI2.....1,039	Diamond Stealth 24VLB w/1M.....179	Full Tower Case w/250w....99	
	Orchid Fahrenheit VRAM.....179	DOS 6.0.....42	
	Orchid Fahrenheit VLB.....189	Fax Modem 96/24.....59	
	ATI UltrPro VLB 2M VRAM.....399	Fax Modem 14.4/14.4.....199	
	Genoa VLB w/1M.....139	Modem 2400.....39	
	SVGA-256/512K/1MB.....29/39/55	Tape Backup 250MB.....199	
	14" CTX 5468A .28 INT.....259	Tape Backup 120MB.....149	
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	14" CTX 1460 .28 VESA.....379	Microsoft Serial Mouse.....59	
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	15" CTX 1560/1560LR.....459/499	Disk Holder 3.5/5.25.....2/3	
	15" CTX 1561/1561LR.....399/459	Mouse pad.....2	
PRINTERS			KEYBOARDS
Panasonic KX-P2180.....179			101 Enhanced Keyboard.....20
Panasonic KX-P1123.....213			Chicony 5181/5161.....35/45
Panasonic KX-P1124i.....293			
Panasonic KX-P1624.....363			
Panasonic KX-P2123.....215			
Panasonic KX-P2624.....399			
Color Kit for Panasonic.....69			
MATH COPROCESSORS			SCSI ADAPTERS
387SX-25/33.....59/69			TE300R SCSI 10MB w/20MB 1015A.....49
387DX-33/40.....69/79			Adaptec 1547B SCSI 10MB w/20MB.....279
			Adaptec 1542B SCSI 10MB w/20MB.....249
			UltraScan 141 SCSI 10MB w/20MB.....209
			UltraScan 241 SCSI 10MB w/20MB.....149
			UltraScan 501 SCSI 10MB w/20MB.....389



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- 2HD/FD controller
- 1.2MB and 1.44MB floppy drive
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- 101 Enhanced keyboard
- Weitek coprocessor socket
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- 2HD/FD controller w/2S, 1P, 1G ports
- 1.2MB and 1.44MB floppy drives
- 101 Enhanced keyboard
- Built-in math coprocessor
- Weitek coprocessor socket
- Clock/calendar w/battery backup
- Vertical case with power supply
- 3 Button High-Resolution Mouse



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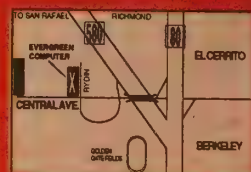
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DeskJet 500

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HP 92295A HP IID, II, IIV	89
HP 92291A HP ILSi	119
HP 92298A HP4	99

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Panasonic KX-P4420	N/A	139	175	189
IBM 4019	109	149	309	N/A
Epson EPL-6000	140	155	190	N/A
Epson EPL-7000	N/A	90	140	N/A
Okidata 400/800	100	150	N/A	N/A
Brother HL-4	130	180	230	280

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Noderunner/A Combo 16-Bit Adapter	238
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Lantastic 5.0 for Windows	144
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Calendar Of Events continued

continued from page 238

AUGUST

August 1-6 SIGGRAPH '93. Anaheim. ACM. Call: (312)321-6830. Email: info92@siggraph.org.

August 3-5 OP/EN Conference & Exposition. Santa Clara. DCI. Call: (408)470-3880.

August 7 Computer Show & Sale Featuring How To Buy, Build, Or Upgrade Your PC Seminar. Oakland Coliseum. Richard James. Call: 1-800-685-1400.

August 8 Computer Show & Sale. Rancho Arroyo Sports Complex, Sacramento. Richard James. Call: 1-800-685-1400.

August 8 The Computer Show & Sale. Marin Civic Center. MarketPro. Call: (415)388-8893.

August 9-12 Groupware '93 Workgroup Solutions Conference And Expo. San Jose. The Conference Group. Call: 1-800-247-0262.

August 14 The Computer Show & Sale. Sonoma Co. Fairgrounds. MarketPro. Call: (415)388-8893.

August 15 Computer Show & Sale. Alameda County Fairgrounds. Richard James. Call: 1-800-685-1400.

August 15 The Computer Show & Sale. Centre Concord. MarketPro. Call: (415)388-8893.

August 21 Computer Show & Sale Featuring How To Buy, Build, Or Upgrade Your PC Seminar. Cow Palace. Richard James. Call: 1-800-685-1400.

August 22 The Computer Show & Sale. Scottish Rite Center, Sacramento. MarketPro. Call: (415)388-8893.

August 23-25 ABCD's Breakaway '93 Conference. San Francisco. ABCD. Call: (601)977-9033.

August 23-25 VAR Support '93 Conference. Santa Cruz. Mikael Blaisdell & Associates. Call: (510)865-4515.

August 23-27 INTEROP 93 Conference. San Francisco. Interop Co. Call: (415)941-3399.

August 24-25 Home Office Technology Conference And Exposition. San Jose. Future Expositions. Call: (408)369-7744.

August 29 The Computer Show & Sale. Marin Civic Center. MarketPro. Call: (415)388-8893.

August 31 IICS Human Interface SIG Meeting. San Francisco. Medius IV. Call: (415)905-6959.

SEPTEMBER

September 13-14 Network Outlook '93 Conference. San Francisco. Technologic Partners. Call: (212)696-9330.

September 19-2 INTEREX Hewlett-Packard Computer User Conference & Expo. San Francisco. INTEREX. Call: 1-800-INTEREX.

September 21-23 Mobile World Conference. San Jose. DCI. Call: (508)470-3880.

CLASSES, SEMINARS, AND WORKSHOPS

JUNE

June 28 Mac Basics Level I Class. San Francisco. Media Alliance. Call: (415)771-7133.

June 28-29 HyperCard: Stack Development Class. San Francisco. Abacus Training. Call: (415)974-7200.

June 28-29 HyperCard: Stack Development Class. San Jose. Abacus Training. Call: (415)974-7200.

June 28-30 NetWare v3.11: System Manager Class. Walnut Creek. Abacus Training. Call: (415)974-7200.

June 28-July 2 NetWare Service And Support Class. San Francisco. Abacus Training. Call: (415)974-7200.

June 29 Advanced FoxPro 2.0 Class. Emeryville. Northwest Computer Systems. Call: (510)653-0808.

June 29 Advanced Paradox Class. Emeryville. Northwest Computer Systems. Call: (510)653-0808.

June 29 Intermediate Lotus 1-2-3 Class. Walnut Creek. Computer Education Center. Call: (510)937-2566.

June 29-30 4th Dimension Class. San Francisco. Abacus Training. Call: (415)974-7200.

June 30 IBM LAN Server 3.0 Course. Oakland. MIS Services. Call: 1-800-300-4MIS.

June 30 Intermediate WordPerfect Class. Walnut Creek. Computer Education Center. Call: (510)937-2566.

June 30 Lotus 1-2-3 Class. Oakland. Action Computer Training Institute. Call: (510)562-5511.

JULY

July 1 Advanced Excel For Windows Class. Walnut Creek. New Horizons Computer Learning Center. Call: 1-800-999-9654.

July 1 Intro To Computers Class. Walnut Creek. New Horizons Computer Learning Center. Call: 1-800-999-9654.

July 1 Intro To UNIX Seminar. San Francisco. Network Services Group. Call: 1-800-998-3540.

July 1 Intro To WordPerfect Class. Walnut Creek. Computer Education Center. Call: (510)937-2566.

July 1 Networking For Small Offices Seminar. San Francisco. Network Services Group.

Call: 1-800-998-3540.

July 1 PageMaker II Class. San Francisco. Media Alliance. Call: (415)771-7133.

July 1 Ten Things You Should Know Before You Automate Your Business Accounting System Seminar. San Francisco. J.C. Luckrich & Co., CPA. Call: (415)905-6900.

July 1 What Lead Tracking Or Contact Management Software Can Do For Your Business Seminar. San Francisco. J.C. Luckrich & Co., CPA. Call: Beth Markus, (415)905-6900.

July 2 Adobe Illustrator I Class. San Francisco. Media Alliance. Call: (415)771-7133.

July 2 Beginning FileMaker Pro For Windows Class. Walnut Creek. New Horizons Computer Learning Center. Call: 1-800-999-9654.

July 2 Intro To Lotus 1-2-3 Class. Walnut Creek. Computer Education Center. Call: (510)937-2566.

July 3 & 17 Local Area Networks: LANtastic To Novell Seminar. Oakland. Excel Micro Solutions. Call: (510)836-2040.

July 5 Mac Basics Level II Class. San Francisco. Media Alliance. Call: (415)771-7133.

July 6 Build & Upgrade An IBM PC Clone Seminar. Oakland. Excel Micro Solutions. Call: (510)836-2040.

July 6 Windows Class. Oakland. Action Computer Training Institute. Call: (510)562-5511.

July 6-13 Macintosh Basics Class. San Francisco. Center For Electronic Art. Call: (415)956-6500.

July 6-7 Access For Windows Class. San Francisco. New Horizons Computer Learning Center. Call: 1-800-999-9654.

July 8-9 CorelDraw 3.0 Course. Sunnyvale. Goals of California. Call: 1-800-462-5763, ext. 6625.

July 8-9 PC Troubleshooting & Repair Seminar. Oakland. Excel Micro Solutions. Call: (510)836-2040.

July 9 Adobe Illustrator II Class. San Francisco. Media Alliance. Call: (415)771-7133.

July 9 Advanced Time Line 5.0 Class. San Francisco. Symantec Professional Services. Call: 1-800-786-8620.

July 9 Beginning Paradox For Windows Class. Emeryville. Northwest Computer Systems. Call: (510)653-0808.

July 9 NetWare 3.11 System Administrator Class. Emeryville. Informational Data Networks. Call: 1-800-696-5267.

July 10 Mac Basics Level I Class. San Francisco. Media Alliance. Call: (415)771-7133.

July 12 Beginning Approach Class. Walnut Creek. New Horizons Computer Learning Center. Call: 1-800-999-9654.

RESOURCES

Calendar Of Events continued

July 12-13 Local Area Networks: LANtastic To Novell Seminar. Oakland. Excel Micro Solutions. Call: (510)836-2040.

July 12-13 Time Line for Windows Class. San Francisco. Symantec Professional Services. Call: 1-800-786-8620.

July 12-23 Interactive Multimedia Intensive Class. San Francisco. Center For Electronic Art. Call: (415)956-6500.

July 13 Intro To Local Area Networks Seminar. San Francisco. Network Services Group. Call: 1-800-998-3540.

July 13 System 7 Workshop. San Francisco. Media Alliance. Call: (415)771-7133.

July 14 Increasing Productivity With Multimedia Seminar. San Francisco. Network Services Group. Call: 1-800-998-3540.

July 14 Intro To Excel Class. Walnut Creek. Computer Education Center. Call: (510)937-2566.

July 15 Beginning Approach Class. San Francisco. New Horizons Computer Learning Center. Call: 1-800-999-9654.

July 15 Intro To Windows 3.1 Seminar. San Francisco. Network Services Group. Call: 1-800-998-3540.

July 15 Intro To Word Class. Walnut Creek. Computer Education Center. Call: (510)937-2566.

July 15 Networking For Small Offices Seminar. San Francisco. Network Services Group. Call: 1-800-998-3540.

July 15-16 CorelDraw 3.0 Course. Santa Clara. Goals of California. Call: 1-800-462-5763.

July 15-16 Q&A 4.0 Class. San Francisco. Symantec Professional Services. Call: 1-800-786-8620.

July 16 Advanced Macros Excel 4.0 Class. Emeryville. Northwest Computer Systems. Call: (510)653-0808.

July 16 Beginners Windows 3.1 Class. Emeryville. Informational Data Networks. Call: 1-800-696-5267.

July 16 Beginners Windows 3.1 Class. Emeryville. Informational Data Networks. Call: 1-800-696-5267.

July 16 cc:Mail For Macintosh Class. Walnut Creek. New Horizons Computer Learning Center. Call: 1-800-999-9654.

July 16 Intermediate DOS Class. Walnut Creek. Computer Education Center. Call: (510)937-2566.

July 16 Intro To DOS Class. Walnut Creek. Computer Education Center. Call: (510)937-2566.

July 17 Fundamentals Of Network Technologies For The Legal Profession Seminar. San Francisco. Network Services Group. Call: 1-800-998-3540.

July 17 Increasing Productivity For Legal Professionals Seminar. San Francisco. Network Services Group. Call: 1-800-998-3540.

July 17 Mac Basics Level II Class. San Francisco. Media Alliance. Call: (415)771-7133.

July 18 Intro To Pre-Press On The Mac Class. San Francisco. Media Alliance. Call: (415)771-7133.

July 19 Advanced Excel For Windows Class. San Francisco. New Horizons Computer Learning Center. Call: 1-800-999-9654.

July 19 Beginning 1-2-3 For Windows Class. Walnut Creek. New Horizons Computer Learning Center. Call: 1-800-999-9654.

July 19 Beginning Paradox For DOS Class. Walnut Creek. New Horizons Computer Learning Center. Call: 1-800-999-9654.

July 19 Excel Class. Oakland. Action Computer Training Institute. Call: (510)562-5511.

July 19 Intro To WordPerfect Class. Walnut Creek. Computer Education Center. Call: (510)937-2566.

July 20 Build & Upgrade An IBM PC Clone Seminar. Oakland. Excel Micro Solutions. Call: (510)836-2040.

July 20 Intermediate 1-2-3 v2.4 Class. Walnut Creek. New Horizons Computer Learning Center. Call: 1-800-999-9654.

July 20 Intro To Paradox Class. Walnut Creek. Computer Education Center. Call: (510)937-2566.

July 20 Lotus 1-2-3 Class. Oakland. Action Computer Training Institute. Call: (510)562-5511.

July 20 Mac Maintenance And Troubleshooting Class. San Francisco. Media Alliance. Call: (415)771-7133.

July 20-August 10 Desktop Publishing Comprehensive Class. San Francisco. Media Alliance. Call: (415)771-7133.

July 21 Beginning 1-2-3 For Windows Class. San Francisco. New Horizons Computer Learning Center. Call: 1-800-999-9654.

July 21 Beginning Illustrator Class. Walnut Creek. New Horizons Computer Learning Center. Call: 1-800-999-9654.

July 21 Beginning Paradox For Windows Class. San Francisco. New Horizons Computer Learning Center. Call: 1-800-999-9654.

July 21-28 Director 1 Class. San Francisco. Center For Electronic Art. Call: (415)956-6500.

July 22 Access 1.0 Class. Emeryville. Northwest Computer Systems. Call: (510)653-0808.

July 22 cc:Mail Class. San Francisco. New Horizons Computer Learning Center. Call: 1-800-999-9654.

July 22 Lotus Organizer For Windows Class. San Francisco. New Horizons Computer Learning Center. Call: 1-800-999-9654.

July 22 PageMaker I Class. San Francisco.

Media Alliance. Call: (415)771-7133.

July 22-23 CorelDraw 3.0 Course. San Francisco. Goals of California. Call: 1-800-462-5763.

July 22-23 PC Troubleshooting & Repair Seminar. Oakland. Excel Micro Solutions. Call: (510)836-2040.

July 23 Advanced Windows 3.1 Class. Emeryville. Informational Data Networks. Call: 1-800-696-5267.

July 23 Word For Windows Tips, Tricks, & Shortcuts Class. San Francisco. New Horizons Computer Learning Center. Call: 1-800-999-9654.

July 23-26 Multimedia Production Workshop. Santa Cruz. UCSC Extension. Call: (408)427-6620.

July 24 Adobe Illustrator I Class. San Francisco. Media Alliance. Call: (415)771-7133.

July 24 Enterprise Information Systems For The Legal Profession Seminar. San Francisco. Network Services Group. Call: 1-800-998-3540.

July 25 A Beginners Guide To Telecommunications On The Mac Course. San Francisco. Media Alliance. Call: (415)771-7133.

July 26 Intermediate Word For Windows Class. Walnut Creek. Computer Education Center. Call: (510)937-2566.

July 26-27 Local Area Networks: LANtastic To Novell Seminar. Oakland. Excel Micro Solutions. Call: (510)836-2040.

July 26-30 Fuzzy Logic Inference Systems Course. San Francisco. Intellignet Inference Systems Corp. Call: (408)730-8345.

July 27 Intermediate Excel Class. Walnut Creek. Computer Education Center. Call: (510)937-2566.

July 27 Mac Basics Level I Class. San Francisco. Media Alliance. Call: (415)771-7133.

July 27 WordPerfect For Windows Class. Oakland. Action Computer Training Institute. Call: (510)562-5511.

July 27-28 Access For Windows Class. Walnut Creek. New Horizons Computer Learning Center. Call: 1-800-999-9654.

July 27-28 Microsoft Project For Macintosh Class. Walnut Creek. New Horizons Computer Learning Center. Call: 1-800-999-9654.

July 28 Beginning Freehand Class. San Francisco. New Horizons Computer Learning Center. Call: 1-800-999-9654.

July 28 Intermediate Paradox Class. Walnut Creek. Computer Education Center. Call: (510)937-2566.

July 28 Intermediate Paradox For Windows Class. Emeryville. Northwest Computer Systems. Call: (510)653-0808.

July 28 Intermediate WordPerfect Class. Walnut Creek. Computer Education Center.

Calendar Of Events continued

Call: (510)937-2566.

July 28 Intro To UNIX Seminar. San Francisco. Network Services Group. Call: 1-800-998-3540.

July 29 Beginning FileMaker Pro For Windows Class. San Francisco. New Horizons Computer Learning Center. Call: 1-800-999-9654.

July 29 Intro To Windows 3.1 Seminar. San Francisco. Network Services Group. Call: 1-800-998-3540.

July 29 Networking For Small Offices Seminar. San Francisco. Network Services Group. Call: 1-800-998-3540.

July 29 PageMaker II Class. San Francisco. Media Alliance. Call: (415)771-7133.

July 29-30 CorelDraw 3.0 Course. Santa Clara. Goals of California. Call: 1-800-462-5763.

July 29-August 12 Computer Media Fundamentals Class. San Francisco. Center For Electronic Art. Call: (415)956-6500.

July 30 Beginning Illustrator Class. San Francisco. New Horizons Computer Learning Center. Call: 1-800-999-9654.

July 30 FreeHand I Class. San Francisco. Media Alliance. Call: (415)771-7133.

July 30 Windows For Workgroups Class. Emeryville. Informational Data Networks. Call: 1-800-696-5267.

July 31 Adobe Illustrator II Class. San Francisco. Media Alliance. Call: (415)771-7133.

July 31 Build & Upgrade An IBM PC Clone Seminar. Oakland. Excel Micro Solutions. Call: (510)836-2040.

AUGUST

August 1-8 FrameMaker Class. San Francisco. Media Alliance. Call: (415)771-7133.

August 2 Mac Basics Level I Class. San Francisco. Media Alliance. Call: (415)771-7133.

August 3 Build & Upgrade An IBM PC Clone Seminar. Oakland. Excel Micro Solutions. Call: (510)836-2040.

August 3 Mac Basics Level II Class. San Francisco. Media Alliance. Call: (415)771-7133.

August 3-September 23 AutoCAD Level II Class. Santa Clara. The Cooper Connection. Call: (408)970-9383.

August 4-11 Director 2 Class. San Francisco. Center For Electronic Art. Call: (415)956-6500.

August 5-26 PhotoShop Intensive Class. San Francisco. Media Alliance. Call: (415)771-7133.

August 5-6 CorelDraw 3.0 Course. San Francisco. Goals of California. Call: 1-800-462-5763.

August 5-6 Local Area Networks: LANtastic To Novell Seminar. Oakland. Excel Micro

Solutions. Call: (510)836-2040.

August 6 Advanced Time Line 5.0 Class. San Francisco. Symantec Professional Services. Call: 1-800-786-8620.

August 6 FreeHand II Class. San Francisco. Media Alliance. Call: (415)771-7133.

August 6 NetWare 3.11 System Administrator Class. Emeryville. Informational Data Networks. Call: 1-800-696-5267.

August 9 Mac Basics Level II Class. San Francisco. Media Alliance. Call: (415)771-7133.

August 9 NetWare 3.11 Advanced System Administrator Class. Emeryville. Informational Data Networks. Call: 1-800-696-5267.

August 9-10 PC Troubleshooting & Repair Seminar. Oakland. Excel Micro Solutions. Call: (510)836-2040.

August 10 Intro To Local Area Networks Seminar. San Francisco. Network Services Group. Call: 1-800-998-3540.

August 11 Increasing Productivity With Multimedia Seminar. San Francisco. Network Services Group. Call: 1-800-998-3540.

August 11 Intro To UNIX Seminar. San Francisco. Network Services Group. Call: 1-800-998-3540.

August 11 Mac Basics Level I Class. San Francisco. Media Alliance. Call: (415)771-7133.

August 12 Intro To Windows 3.1 Seminar. San Francisco. Network Services Group. Call: 1-800-998-3540.

August 12 Networking For Small Offices Seminar. San Francisco. Network Services Group. Call: 1-800-998-3540.

August 14 Mac Basics Level I (In Spanish) Class. San Francisco. Media Alliance. Call: (415)771-7133.

August 14 & 28 PC Troubleshooting & Repair Seminar. Oakland. Excel Micro Solutions. Call: (510)836-2040.

August 16 Adobe Illustrator I Class. San Francisco. Media Alliance. Call: (415)771-7133.

August 16 PageMaker I Class. San Francisco. Media Alliance. Call: (415)771-7133.

August 16-17 Time Line for Windows Class. San Francisco. Symantec Professional Services. Call: 1-800-786-8620.

August 17 Build & Upgrade An IBM PC Clone Seminar. Oakland. Excel Micro Solutions. Call: (510)836-2040.

August 18 DOS Basics Class. San Francisco. Center For Electronic Art. Call: (415)956-6500.

August 18 Mac Basics Level II Class. San Francisco. Media Alliance. Call: (415)771-7133.

August 18-September 8 Interactive Media Production 1 Class. San Francisco. Center For Electronic Art. Call: (415)956-6500.

August 19-20 CorelDraw 3.0 Course. Santa Clara. Goals of California. Call: 1-800-462-5763.

August 19-20 PC Troubleshooting & Repair Seminar. Oakland. Excel Micro Solutions. Call: (510)836-2040.

August 19-20 Q&A 4.0 Class. San Francisco. Symantec Professional Services. Call: 1-800-786-8620.

August 19-26 Macintosh Basics Class. San Francisco. Center For Electronic Art. Call: (415)956-6500.

August 20 Advanced Windows 3.1 Class. Emeryville. Informational Data Networks. Call: 1-800-696-5267.

August 21 Mac Maintenance And Troubleshooting Class. San Francisco. Media Alliance. Call: (415)771-7133.

August 21 System 7 Workshop. San Francisco. Media Alliance. Call: (415)771-7133.

August 22 Mac Basics Level I Class. San Francisco. Media Alliance. Call: (415)771-7133.

August 23 Adobe Illustrator II Class. San Francisco. Media Alliance. Call: (415)771-7133.

August 23 PageMaker II Class. San Francisco. Media Alliance. Call: (415)771-7133.

August 23-24 Local Area Networks: LANtastic To Novell Seminar. Oakland. Excel Micro Solutions. Call: (510)836-2040.

August 24 Intro To Local Area Networks Seminar. San Francisco. Network Services Group. Call: 1-800-998-3540.

August 24-September 14 MacroMedia Director Class. San Francisco. Media Alliance. Call: (415)771-7133.

August 25 Increasing Productivity With Multimedia Seminar. San Francisco. Network Services Group. Call: 1-800-998-3540.

August 25 Intro To UNIX Seminar. San Francisco. Network Services Group. Call: 1-800-998-3540.

August 25-26 Supporting & Troubleshooting Windows 3.1 Seminar. San Francisco. Data-Tech Institute. Call: (201)478-5400.

August 25 Intro To Windows 3.1 Seminar. San Francisco. Network Services Group. Call: 1-800-998-3540.

August 26 Networking For Small Offices Seminar. San Francisco. Network Services Group. Call: 1-800-998-3540.

August 27 Windows For Workgroups Class. Emeryville. Informational Data Networks. Call: 1-800-696-5267.

August 28 A Beginners Guide To Telecommunications On The Mac Course. San Francisco. Media Alliance. Call: (415)771-7133.

August 29 Mac Basics Level II Class. San Francisco. Media Alliance. Call: (415)771-7133.

August 30-31 CorelDraw 3.0 Course. Santa Clara. Goals of California. Call: 1-800-462-5763.

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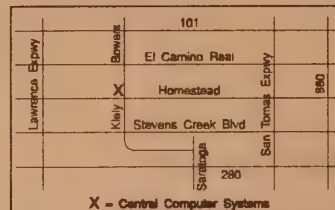
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VLB 486-50, 256K cache 1855
VLB 486-DX2-66, 256K cache 1935

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Mitsumi 101 Keyboard
MS Serial Mouse
MS DOS 6.0 & Windows 3.1

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486-50 ISA 256K cache VLB 1285
486-33 ISA 256K cache VLB 1185

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IDE Controller, 2S 1P
Baby AT Case w. 200W
Mitsumi 101 Keyboard
MS DOS 6.0 & WIN 3.1
MS Serial Mouse

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486-50 EISA 256K cache VLB 1395
486-33 ISA VLB 256K cache 1035

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with IBM OS/2:

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486 DX-33 8MB, 212MB HD 1765
8MB, 120MB HD 1585
486 SX-25 8MB, 170MB HD 1360
8MB, 80MB HD 1180
386 SLC-25 2MB, 80MB HD 889

with Windows 3.1 & DOS 5.0:

486 DX2-66 4MB, 212MB HD 2125
486 DX-33 4MB, 212MB HD 1660
4MB, 120MB HD 1495
486 SX-25 4MB, 170MB HD 1235
4MB, 120MB HD 1065

II HARDWARE

1. CD ROM

CD Caddy / Sony CD Caddy 7.50/9
Gallant Sound Card 79
Labtec Speakers 25
Koss Maximum DR Amplified Speakers 69
Koss Amplified Mini Speakers w. Equalizer 45
Turtle Beach 16 bit MultiSound 515

CREATIVE LAB

CD-ROM Upgrade Kit w. 4 CD Int 375
CD 531 w. controller Kit Ext 275
Discovery CD-16 Int 469
Edutainment CD-16 Int Kit 519
Sound Blaster Pro Multimedia Kit w. 6 CD titles
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Sound Blaster Deluxe 89
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Sound Blaster 16 ASP 205
Video Blaster / Video Spigot for Win 315/425
Voice Blaster / Wave Blaster 75/245
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LOGITECH

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MEDIA VISION

Multimedia Upgrade Kit (w. Spectrum 16) 839
Midi Mate / w. Passport Design Trax 55/89
Pro Audio Studio 16 195
Pro Audio Spectrum 16 159
Pro Movie Spectrum 239

MITSUMI

CD 700 w. controller 199

NEC

CD-74 280ms, 300KB/s, Ext 599
CD-84 280ms, 300KB/s, Int 465
Interface Kit for PC 89
Multimedia Upgrade Kit Int / Ext 895/995

SONY (w/o software)

CD 31A w. controller Int 235

TEXEL

DM-3024 265ms, Int / w. controller 365/435
DM-5024 265ms, Ext / w. controller 445/515
Driver kit for CD-ROM Int / Ext 29/69

TOSHIBA

3401B 200ms 300KB/s Int / w. controller 435/505
3401E 200ms 300KB/s Ext / w. controller 559/629
Driver kit for CD-ROM Int / Ext 29/69

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2. CASES

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Baby Tower w. 200W Power 69
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Mid Tower w. 250W Power: Black/ White 139/129
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- 1 half ht or SCSI for Mac, 40W, w. Int cable 99
- 2 half ht or 1 full ht for PC, 60W 119

- 2 half ht or 1 full ht for Mac, w. cables 60W 139
- 3 half ht or 1 full & 1 half ht for PC, 60W 139
- 3 half ht or 1 full & 1 half ht for Mac, w. cables 159

3. CONTROLLERS

4 Floppies w. IDE for AT (usa made) 39
COREL SCSI s/w / w. 8bit controller 75/95

ACCULOGIC (w/o cable)

siIDE-2 (2 IDE HD only) 26
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1522K SCSI w. Kit (3MB/s) 159
1542C SCSI w. Kit (10MB/s) 249
1542C Plus w. ASW 500 315
1640 SCSI w. Kit for MCA 335
1742A SCSI EISA w. Kit (2F & 2H) 425
ASW-1410 ASPI MS-DOS Manager v3.0 69
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AIR

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ALWAY TECHNOLOGY

AL1000 Pro Corel 189
IN 2000 High Performance 16 bit SCSI 179
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AMI

FastDisk cache SCSI EISA (up to 16MB) 495
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DTC

2290 IDE EISA 139
3280AS SCSI 105
3290AS EISA SCSI host adapter 479
6282 1:1 ESDI 125
7287 1:1 RLL 73

FUTURE DOMAIN SCSI Controller

TMC 1660 for AT (H only) 119
TMC 1660 DNK for AT (H only) w. Kit 219
TMC 1680 for AT (4F & H, 15MB/s) 139
TMC 1680 SVP (SCSI value pack) 175
TMC 1680 DNK for AT (4F & H) w. Kit 249

KOUWELL

4 Floppies controller for XT, AT 33
4 Floppies (2.88MB) w. 2 IDE 55
IDE controller 27
IDE controller w. AT I/O (2S 1P 1G) 34
IDE controller w. NS16550 chips (2S 1P 1G) 59
IDE controller w. AT I/O (2S 1P) VLB 55

MICROSOLUTIONS

CompatiCard IV: 4 Floppies controller (2 ext)
360K/720K/1.2MB/1.44MB/2.88MB FD 79

MYLEX

DCE 376 EISA SCSI w. 4MB cache 725

NCL America (w. on board Bios)

538B IDE for AT (2HD & 2FD) 45

ORCHID

VESA LBus IDE (2HD, 2FD) w. AT I/O 79

PROMISE Drive Cache Controller

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DC 200 IDE cache up to 16MB 129
DC 2032 IDE I/O cache up to 16MB 145
DC 2040 SCSI cache up to 16MB 225
- Bios chips & CD driver 39
DC 4030VL IDE VLB cache up to 16MB 175

ULTRASTOR

ULT 12C/1 ESDI 1MB cache 419
ULT 15C IDE 8MB 256K cache 195
ULT 14F ISA SCSI 32K cache 215
ULT 24F SCSI EISA 64K cache 375
ULT 34F VLB SCSI-2 32K cache 285

4. CPU

AMD386 DX-40 85
INTEL

386 DX-25 / DX-33 85
486 DX-33 / DX-50 319/439
486 DX-25 / DX2-66 419/539

MATH CO PROCESSOR

CYRIX

83D87 - 25 / 33 / 40 85/75/85
Cx486 DLC 33 / 40 105/155

INTEL

387DX / 387SX 85/79
OverDrive Processor

- 486 SX16 / SX20 395
- 486 SX25 / DX25 495
- 486 SX33 / DX33 659
Cooling Fan (heat sink) 19.50

5. DIGITIZERS

SummaSketch III 12x12, 4 or 16 button 299
SummaSketch III 12x18, 4 or 16 button 549

6. DRIVES

Frame for 3.5" Hard Drive and Floppy Drive 6
Removable Hard Drive Case for 3.5" HD 39

HARD DRIVES

CONNER

CP30084E 84MB 19ms IDE 64K 165
CP-30104 120MB 19ms IDE 3.5", 1" ht 179
CP30174E 170MB 18ms IDE 3.5", 1" ht 205
CP-30254 250MB 14ms IDE 64K 1" ht 269
CP-30544 544MB 12ms IDE 665

FUJITSU (5 years warranty by manufacturer)

2624T 520MB 12ms IDE 3.5" 1/2" ht 709
2624FA 520MB 12ms SCSI-1&2 725
M2694ESA 1.0GB 10ms SCSI-2 3.5" 1/2" ht 1195
2266SA 1.2GB 15ms SCSI-1 5.25" full 1099
M2652S 2.0GB 11ms SCSI-2 5.25" full 1995
M2654S 2.1GB 12ms SCSI-2 5.25" full 2145

MAXTOR

MXT 7120A 130MB 15ms IDE 3.5" 185
MXT 7213A 213MB 15ms IDE 3.5", 1" ht 225
LXT 7345A 345MB 13ms IDE 3.5" 325
LXT 7120S 130MB 15ms SCSI 205
LXT 7213S 200MB 15ms SCSI 3.5" 269
540SL 540MB 8.5ms SCSI-2 1" ht 859
MXT 1240S 1.2GB 8.5ms SCSI-2 3.5" 1189
PO-12 1.2GB 13ms SCSI 985
PI-17S 1.7GB 13ms SCSI 1215

Optical Drives: Rewritable 1 GB 35ms SCSI

Ext Tahiti II / 1 GB Cartridge Glass 2635/199

MICROSOLUTIONS (External Hard Drive)

40MB / 100MB (use printer port) 345/455

QUANTUM

EIS 127AT 127MB 17ms IDE 32K cache 185
EIS 170AT 170MB 17ms IDE 205
LPS-240AT 244MB 16ms IDE 256K cache 279
LPS-240S 244MB 16ms SCSI 256K cache 289
LPS-525S 525MB 10ms SCSI 512K cache 795
PRO-700S 700MB 10ms SCSI-2 512K 955
PRO-1225S 1.2GB 9ms SCSI 1.2M cache 1259

TEAC

SD 3105 105MB 19ms IDE 1" ht 169

FLOPPY DRIVES

MICRO SOLUTIONS (External Floppy Drive)

1.2 / 1.44 (use printer port) 175

SYQUEST

SQ441 44MB Int 205
SQ446 44MB Ext w. controller & cartridge 425

TEAC (Floppy Drive)

1.2MB 5.25" 53
1.44MB 3.5" w. frame 47
2.8MB 3.5" w. frame 89
Dual Floppy 1.2MB & 1.44MB 129

7. I/O CARDS

KOUWELL

2S 1P 1G w. NS16550 chipset (XT, AT) 49
4 Serial ports card 79
AT I/O (2S 1P) / AT I/O (2S 1P 1G) 27/27
AT I/O (2S 2P) 33
AT I/O w. IDE (2S 1P 1G) 34
Printer card / Serial card (XT, AT) 15/15

QUICKPATH

13 port I/O w. 4-16550UARTS
(2 IDE, 4F, 4S, 2P, 1G) 115

STB 4-COM

4 serial, 16 bit, w. 16554, support
COM 1-8, IRQ 2,3,4,5,10,11,12,15 109

SIIG

2S 1P 1G w. 16550 chipset 49

8. KEYBOARDS

FOCUS

FK2001 101 click 42
FK8000 111 w. calculator 45
FK9000 129 keys Programmable 65

NORTHGATE OMNI

101S / 101NI / 102 55/69/69
Ultra T or F 95

SIIG (click)

Suntouch Jr. 84-key Mini 45
Suntouch 101 49

OTHERS

BTC 84-key Mini 39
KeyCat II 101 w. trackball mouse 72
Keytronic 101 37
Maxi 101 35
Mitsumi 101 30
PT505C 101 27

9. MEMORY CARDS

ACCULOGIC

RAMPAT! up to 16MB(SIMM), 16 bit, AT 99
SIMM-ply Ram 8/16 bit, 8MB max, XT, AT 145
SIMM-ply Ram 16 bit, 8MB max, PS/2-50, 60 169
SIMM-ply Ram 32 bit, 8MB max, PS/2-70, 80 179

INTEL

Above Board w. 512K 159

10. MEMORY CHIPS

DRAM

1 MB x 1 - 80 ns 3.99
64K - 100 ns / 256K - 80ns 1.39
256K x 4 - 80 ns 4.29
64K x 4 - 80 ns 1.65

SIMM

16 MB x 9 - 70 ns 690
4 MB x 9 - 60 / 70 ns 180/155
1 MB x 9 - 60 / 70 / 80ns (3 chips) 38/36/34
256K x 9 - 70 ns 11
1 MB x 36 - 60 / 70 ns 160/150
4 MB x 36 - 70 ns 620
SIMM Mac: 1 MB x 8 - 80 ns 35
SIMM Mac: 4 MB x 8 - 70 / 80 ns 140/130

SIPP

1 MB x 9 - 70 ns (3 chips) 39

COMPUTER MEMORY (3rd Party):

IBM	
- PS/2 50Z/ 55SX/ 65SX/ 70	
- 2MB / 4MB	89/159
- PS/2 80 - 111/ 311/ 121/ 321	
- 2MB	115
IBM PS/2 80 - A21/ A31/ A6	
- 4MB	279
COMPAQ	
- Deskpro 386N/ 386S/ 20	
- 2MB / 4MB	105/175
- Deskpro 386 - 20e/ 20/ 25e	
- 1MB / 4MB	95/189
- Deskpro 486M	
- 2MB / 4MB / 8MB	109/169/309
- LTE 286 - 1MB / 2MB	79/109
- LTE 386S/ 386-20	
- 1MB / 4MB card	89/195
- SLT 286	
- 1MB / 4MB	99/259
ProLinea 386 - 25ZS/ 25S	
- 2MB / 8MB	105/375
- ProLinea 486 - 33/ 50/ 25S	
- 2MB / 4MB / 8MB	95/159/299

KINGSTON MEMORY for

Apple, AST, AT&T, Compaq, IBM, NEC, Sun. call
NOTEBOOK / LAPTOP (3rd Party)

AST EXEC 4MB	139
COMPAQ	
- Contura	
- 2MB / 4MB / 8MB	105/165/295
- LTE 20/25	
- 2MB / 4MB / 8MB	125/189/340
IBM L40SX/ N33SX	
- 2MB / 4MB / 8MB	125/189/330
MAC PowerBook 140/ 170	
- 2MB / 4MB	135/179
NEC UltraLite III SL25C	
- 2MB / 4MB / 8MB	139/249/435
Packard Bell 386SX	
- 2MB / 4MB	155/259
Panasonic 170/ 270/ 370	
- 1MB	79
TOSHIBA	
- T2200SX 4MB / 8MB	179/299
- T3200 3MB	189
- T3200SX 2MB / 4MB	105/169
- T3100SX 2MB / 4MB	109/167
- T5100/ T13100/ T1600 2MB	115
- T8500/ T5200 2MB / 8MB	125/339

LASER PRINTER MEMORY UPGRADE

Jet Ram (3rd Party):

EPSON EPL 6000	
- 2MB/ 4MB	129/199
HP	
- Deskjet 500/500C	
- 256K	69
- Laser Jet IIP+/ III/ IIIP/ IIID	
- 1MB / 2MB / 3MB / 4MB	75/115/155/195
- Laser Jet II/ IID	
- 1MB / 2MB / 4MB	95/135/205
PANASONIC	
- KX-P4410/ 4430	
- 1MB / 2MB / 4MB	105/139/215
- KX-P4420/ 4450I	
- 1MB/ 2MB/ 4MB	99/139/209
- KX-P4450 -1MB	139
- KX-P4455 -2MB	159
QMS	
- P-S 410	
- 1MB / 2MB / 4MB	99/139/209
- P-S 815/ 825	
- 2MB / 4MB	159/229

TEXAS INSTRUMENTS

- Micro Writer -1MB	69
PACIFIC DATA:	
Pacific 4 for HP IIP+/ IIIP/ III/ IIID	
- 1MB / 2MB / 4MB	89/129/209
1-2-4 Plus for HP II/ IID	
- 1MB / 2MB / 4MB	115/155/235
Pacific 4 SIMM for HP 4/ IIISI/ XL300	
- 4MB / 8MB	189/339
Pacific T for Epson 6000	
- 2MB / 4MB	199/299
ProTracer	
- 5MB / 8MB	385/535

11. MODEMS & FAX

ASAP TF-333 Phone & Fax Auto Switching	89
National Semi Tylin 2000 Answer/Fax	165
Micc Global Pocket Fax, Tripple 96	159
Adtech Micro Systems (DOS & WIN)	
Data Fax 9624VI, MNP5	99
Hi - Per 96/144, MNP5	199
Pocket 96/24 Fax	115
Pocket 144/144 Fax	269
E-Tech	
Bullet modem 9696 MNP5 Int/Ext	135/155
Ultimate Pocket Fax modem (w. Win/DOS s/w)	
- P1496MX / P9696MX	265/199
- P1414MX (Distinguish ring & Called ID)	295

EVEREX

Evercom 9600 v.42, v.32, MNP5 Int	135
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FRECOM

Fax 96 w. 1 Liner & Far Fetch Fax	115
Fax 96 & modem for DOS	99

GVC

14.4 Fax Modem Int / Ext	169/189
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HAYES

Accura 2400 Int (special)	(39)69
Accura 2400 Ext (special)	(49)79
Accura 96 Ext + 96 Fax	239
Accura 14.4 Ext + 144 Fax	265
Optima 96 v.42, MNP 5 Ext	349
Optima 96 Ext + Fax 96	375
Optima 144 Ext + Fax 144	399
Pocket edition 2400 w. Smartcom EZ	129
Ultra 96 v.42, MNP5 Ext	549
Ultra 144 v.32bis, v.42, v.42bis Ext	585
V-series SmartModem 9600 v.42, MNP5 Ext	499
Smart Com Exec/ WIN/Smart Com III	75/109/119

INTEL

14400 EX v.32bis, v.42, MNP5 Ext	465
Faxability Plus/OCR for WIN trade-up	99
SatisFaxtion modem (w. FAXability s/w)	
- 100 Int send96 rec.48, 2400 modem	99
- 200 Int 96/24 v.42, MNP5	295
- 300 Int 96/144 v.42 (no scan port)	255
- 400 Int 144/144 v.42, v.32bis, MNP5	395
- 400e Ext 96/14.4, 4K data buffer	425

MEGAHERTZ

PCMCIA 14.4 Fax, credit card size modem	445
PCMCIA 96/24 Fax/modem	295
PZ144 Pocket 14.4/14.4	415

MICROCOM

Microporte 4232bis Fax modem	465
QX 4232bis modem	455
QX 4232bis+ modem	575

PRACTICAL PERIPHERALS

PM14.4FX14.4 Int/ PM14.4FXSA Ext	225/395
Mini Tower 96/96 Ext	209
Mini Tower 14.4/14.4 Ext	235
96/48 Fax 2400 Mini modem	95
PM2400 Mini pocket modem	119
FaxMe (turn HP Laser to Fax receiving)	175

SIIG

TeleCommunicator 10-in-1 Fax Modem	239
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US ROBOTICS

Courier 144 v.32bis, v.42, MNP5 Int	375
Courier 144 v.32bis, v.42, MNP5 Ext	385
Courier 144 w. Fax Ext	399
Courier HST-DS 144 v.32bis, v.42, MNP Ext	725
Sportster 96 modem MNP5 Int/Ext	149/159
Sportster 96/96 Fax Int/Ext	159/159
Sportster 14.4/14.4 FAX MNP5 Int/Ext	175/195
Sportster 14.4/14.4 Fax for Mac Ext	225
Shared Access Modem Sharing Kit	675

ZOLTRIX

2400 baud modem w. MNP5 Int	39
96/24 send & rec. fax/modem w. MNP5 Int	69
96/24 fax/modem v.42, MNP5 Int	99
14.4/14.4 fax/modem Int	189
Pocket send & rec. fax/modem Ext	119

ZOOM

AFC Int	69
AFX Ext	89
FC9624V w. WinFax Lite Int	99
FX9624V w. WinFax Lite Ext	109
96/96 Fax/modem MNP5 Int/Ext	209/239
144/144 Fax/modem Int/Ext	219/249
96/96 w. WinFax Lite Int/Ext	219/249
144/144 w. WinFax Lite Int/Ext	229/259

ZY-XEL

U1496B 16.8 voice 14.4 Fax WINS/w Int	345
U1496B+ upgradable to 19.2Kbps Int	455
U1496E 16.8 voice 14.4 Fax WIN, LED Ext	349
U1496E+ upgradable to 19.2Kbps Ext	459

12. MONITORS

9" VGA Mono paper white 640 x 480	135
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SIIG

9" Mono paper white	115
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STANDARD TECHNOLOGIES

400-M VGA 1024x768 Paper white, 110/220v	115
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EMC

EM 1412 14" Mono amber, 90-260v	95
EM 1428 14" 1024x768 .28, 90-260v	279
EM 1430 14" 1024x768 .28 NI, 90-260v	315
EM 1439 14" 1024x768 .39	235

IBM PS/Value Point

6312 14" 1024x768 .28, NI	399
6314 14" .28, NI w. Digital Pro Control	515
6319 15" Flat 1024x768 .28, NI	639

MAG (Auto Switch Power Supply)

PMV1448 14" 1024x768 .28, NI	365
MX14S 14" 1280x1024 .26, Sony Trinitron	525
MX14F 15" Flat 1280x1024 .28, NI, MacII	575
MX17F 17" Flat 1280x1024 .26, NI, MacII	1055
Mac Adapter	25

MITSUBISHI

HL6955SETK 20" 1280x1024 .31, NI	1745
Diamond Pro(TFS 6705) 17" 1280x1024 .26	
NI, Trinitron, MacII, 100-240v	1075
BNC Cable	39

NANAO (100-240v)

F340IW 15" Full Flat screen, 1024x768 .28	719
T560I 17" 1280x1024 .25, NI, MacII	1695
F550I 17" 1280x1024 .28, NI, Mac	1075
F550IW 17" 1280 x 1024 .28, NI, Mac	1125
T660I 20" 1280x1024 .31, NI, Trin, MacII	2595
F750I 21" 1280x1024 .31, NI, MacII	2095
MacII cable adapter	69

NEC (120v)

3FGX 15" 1024x768 .28, Mac	579
4FGe 15" Flat 1024x768 .28, NI, Mac	709
5FGe 17" 1024x768 .28 NI (no Accu color)	1099
6FG 21" Flat 1280x1024 .28, Mac	2395
NEC Monitor Lens (Anti-reflection, Anti-static)	
- for 4FG / 5FG / 6FG	74/115/185
FG / MacII cable adapter kit	19.50

PANASONIC (90-140v)

C138ti 14" SVGA 1024x768 .28, Int, MacII	325
C1395 14" 1024x768 .28, NI, MacII	435
C1991 20" 1024x768 .31, NI, MacII	1455

POWER II

3E 14" SVGA 1024x768 .28, Int, 90-264v	285
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SAMSUNG

CSD5577 15" Flat 1024x768 .28, NI	455
CSF7487 17" 1280x1024 .26, NI, 90/264v	899

SEIKO (90-132v)

CM1450 14" 1024x768 .25, NI	425
CM2050 20" 1024x768 .31, NI, Mac	1495

SONY

1430S 14" 1024x768 .25, NI, 120v	599
1604S 17" 1024x768 .25, NI, 100-240v	965
1730 17" 1024x768 .25, NI	995
2038 20" 1280x1024 .30, NI	2295

VIEWSONIC

4e 14" 1024x768 .28, Int, 110/220v	305
5+ 14" 1024x768 .25, NI, MacII	495
5e 14" 1024x768 .28, NI, MacII	395
6e 14" 1024x768 .28, NI	335
6FS 15" 1024x768 .28, NI, 90/264v	535
15 15" 1280x1024 .28, NI, Mac II	579
7 17" 1280x1024 .28, NI, MacII	975
17 17" 1280x1024 .28, NI, Mac II	1225
8 20" 1280x1024 .31, NI, MacII	1595
20 20" 1600x1280 .28, NI, Mac II	1895
Mac cable adapter	35

13. MOTHERBOARDS

386-33 w. 128K cache (no cpu)	125
386-40 w. 128K cache (no cpu)	129
486-33 128K ISA / 256K VLB (no cpu)	135/149

AIR (w/o cpu)

486-33 / DX2-66 256K, 3VLB slots	235
486-50 256K, 3 VLB slots	235
486-50 256K EISA, 3 VLB slots	475
486-33 / DX2-66 256K EISA, 3 VLB slots	465
EISA upgrade to 512K cache	100

AMI

Super Voyager 486-33 256K VLB	875
Super Voyager 486-50 256K VLB	995
Super Voyager 486 DX2-66 VLB	1225
Enterprise II 486-50 EISA 128K	1145
Enterprise III 486-33 256K VLB EISA	995
Enterprise III 486-50 256K VLB EISA	1195
Enterprise III 486 DX2-66 256K VLB EISA	1345

IBM

486SLC-50 64K cache ISA	389
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LYNX (made in USA, w/o cpu)

486DX - 33 / 50 / DX2-66 256K VLB	185
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MICRONICS

386SX-20 Phoenix BIOS (32MB max)	175
386-33 64K cache Gemini (32MB max)	299
486-50 256K cache EISA E2	1195
486-33 Local Bus w. 256K cache	695
486-DX2-50 Local Bus w. 256K cache	795
486-DX2-66 Local Bus w. 256K cache	895
486-33 256K EISA VLB	1025
486-DX2-50 256K EISA VLB	1225
486-DX2-66 256K EISA VLB	1395
MiniBoard 486-33 256K cache ISA	645
MiniBoard 486-50 256K cache ISA	785
MiniBoard 486-DX2-50 256K ISA	765
MiniBoard 486-DX2-66 256K ISA	885
4MB Piggy Back (up to 8MB)	299
16MB Memory Card	150

NICE (w/o cpu)

486-33 / DX2-66 256K VLB	225
486-50 / DX2-66 256K Mini EISA VLB	295
486-50 / DX2-66 256K EISA VLB	465

ORCHID (w/o cpu)

Superboard 486 (VLB for VGA & controller)	
- DX33/ DX50/ DX2-66 256K	245/265/245

QUICK-PATH

486-50 w. 64K cache, 15ns ISA (no cpu)	275
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14. MOUSE

JOYSTICK	
- Flight Control (thrustmaster)	69
- Warrior 5, Quick shot	14.50
- Weapons Control (thrustmaster)	85
Adapter kit	16.50

AGILER

AGM-600E Serial 400 dpi	23.50
ATB-610 Serial Trackball	24.50
Keen	12.50

APPOINT (special)

MousePen Pro	49
Thumbelina (portable)	49

GENIUS

GM-F302 (3 button)	29
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IMSI

PC Stylus (Mouse & Trackball for CAD)	35
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KENSINGTON

Bus	115
Expert serial & trackball	99

LOGITECH

Cordless	89
Dexa Serial / First Serial	27/37
Fotoman Digital Camera for PC & PS/2	485
Mouseman Bus / Serial	64/59
Scanman 256 / w. OCR software	199/239
Scanman color - 16.8 million colors	439
Trackman Portable / Trackman Combo	99/75

MICROSOFT

Mouse w. WIN 3.1	149
Ball Point (portable)	119
Bus 400PPI / Bus 2.0	85/89
Serial 400PPI	55
Serial 2.0 w. PS/2 port	79
Serial 2.0 w. 9 to 25 pin adapter	79

MOUSE SYSTEMS

New Point (trackball for laptop & PC)	54
Little Mouse PC (2 button optical) serial	29
Omni (2 button) J hook	25
PC III Serial (optical) / Mouse Pad	59/19
PC Trackball II	55
Page Brush - color scanner	399
Pen Mate - digitizer	155
Serial Bus Card (9 IRQs)	24
The New Mouse 400CPI (3 button)	55
The White Mouse - w. Power Panel	39

CASTELLE

FaxPress (Network Fax Server)	
- Novell 1 line Ethernet coax	2595
- Novell 2 lines Token Ring 16/4Mbps	3225
JetPress (Network Print Server)	
for HP II, IID, III, IiD, coax / TP	429
LANPress (Print Server) connects up to 4 printers	
- Ethernet Thick/Thin coax (1P 3S)	475
- Ethernet Thick/Thin coax (2P 2S)	625
- Ethernet 10BaseT (1P 3S) / (2S 2P)	475/635

CC:MAIL

cc:Mail DOS v4.0	199
cc:Mail WIN platform	339
cc:Mail 10-user / 25-user pack	239/579
cc:Mail Gateway v3.21	879
cc:Mail FAX v1.2	1350
cc:Mail Remote	199

COMPLAN

Ethernet	
- 8 bit E100 coax (special)	69
- 8 bit ET500 TP	69
- 16 bit E200 coax	85
- 16 bit ET600 TP	85
- Boot Prom (for E100/ E200/ E300/ E600)	25
- Hub 8 port TP +1BNC +1 cascading	285
- 12 port TP +1BNC +1 AUI +1 cascading	465
- Pocket adapter for coax / TP	159

Archnet

- 16 bit for XT/AT Star Topology	69
- 16 bit for XT/AT Bus / TP	79/79
- 16 bit "4-in-1" Turbo Star & Bus (w. NCR 90C98A ASIC)	99
- 4-port Archnet Passive Hub	19
- 8-port Coax Stackable Active Hub	149

D-LINK

Network Cards	call
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KINGSTON

Networks Cards	call
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FARALLON

PN381 PhoneNet w. Timbuktu for WIN	259
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GATEWAY COMMUNICATION

G/Ethernet 16 coax / 32 bit	99/350
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INTEL

EtherExpress Flash LAN Adapter (combo)	155
EtherExpress 16 coax/16 TP	135/139
EtherExpress 5 pack coax/ TP	545/555
EtherExpress 16 MCA / 16 MCA TP	179/189
EtherExpress 32 EISA	439
12 port Hub EtherExpress ISA Adapter	565
12 port Hub EtherExpress EISA Adapter	645
LAN Protect 1.5 (virus protection)	685
LAN Sight 3.0 Network Utility / Monitor	299
LANSpool s/w 386 NLM v3.5.8	425
NetPort II Thin / Thick Ethernet	519
NetPort II 10BaseT	529
NetPort II Token Ring	759
NetSatisfaction V.2 (s/w for NOVELL)	955
RJ45 Harmonica	55
TakenExpress 16/4 ISA/ EISA/ MCA	535/685/535

NOVELL

NE1000 coax ethernet (special)	99
NE2000 plus coax ethernet / 5 pack	139/595
NE2000-TP plus TP ethernet / 5 pack	135/575
NE2000 Network Lite starter kit	365
NE2000 Plus Combo / 5 pk	145/650
NE3200 Eagle coax EISA	675
NE3200 EXOS coax EISA	625
NTR 2000 Token Ring	435
Eagle NE10T 4 Port Hublet	225
EPROM for NE2000	35
EXOS NE10T-Hub, 8 Port (8 TP + 1 coax)	335
Network Lite 1.1 + DR DOS 6.0	65
Network Lite w. Win Utilities	75
Network 2.2	
- 5 / 10 / 50 / 100-user	489/1089/1995/2955
Network 3.11	
- 5 / 10 / 20-user	599/1345/1885
- 50 / 100 / 250-user	2650/3859/6885
Network 4.0	
- 5 / 10 / 25-user	935/2095/2895
- 50 / 100 / 250-user	3925/5495/9695

SMC (Western Digital)

Ethercard Plus Elite 8 bit coax	115
Ethernet Plus Elite 16 coax / 16 TP	139/145
Ethernet Plus Elite 6 pack 16 coax/16 TP 725/750	
3016 16bit coax / 16bit TP	145/149
Ethercard Elite 16 combo / 6 pk	175/840
Ethercard Plus/A for MCA / TP	215/219
Ethernet Elite 32 bit coax / TP	650/660
Network Boot ROM for ethernet	34
8 Port Concentrator (8TP+1AUI)	339
12 Port Concentrator (12TP+2AUI+1BNC)	595
Token Ring 16/4 ISA / MCA	379
WD-8003 EP Ethernet Plus Elite 8bit coax	49
WD Lan-ETP 8bit TP (cable included)	39
WD Lan-10T/A for MCA (cable included)	65

XIRCOM (Pocket Adapter)

PCMCIA Ethernet BNC / RJ45	285/289
PCMCIA Ethernet Combo	325
PE3-10B2 coax	295
PE3-10BT TP	299
PE3-10B2 Combo	329

CABLES & ACCESSORIES

Twisted pair cable, TP 4-pair, PVC, Level 3	
- 1000' / 500' / 200'	89/55/35
10 BASE-T cable, 1000' Level 3 plenum	165
RG58 cable, 1000'	109
Belden 8259, RG58, 1000'	165

16. POWER SUPPLIES

AMERICAN POWER CONVERSION (UPS)

APC-400 Smart-UPS (286, 386 WS)	309
APC-600 Smart-UPS (386, 486 FS)	399
APC-900 Smart-UPS (386, 486, FS & WS)	639
APC-1250 Smart-UPS (multiple FS & WS)	799
APC-450 Back-UPS 286, ps/2, 386	235
APC-600 Back-UPS 286, 386 FS	285
APC-800 Back-UPS 800RT, 2-4ms, 15 mins	565
APC-750 On-Line UPS (286, 386, 486 FS)	1365
APC-1500 On-Line UPS (multiple servers)	2499
APC PowerChute Plus for Novell	79
APC UPS Monitoring Board for NetWare	69
Power Doctor (DOS) I/F Kit for Smart-UPS	79

GENERAL

200W for XT / UL	48
250W for Baby AT/ Baby or Mid Tower	48
250W for AT	48
250W for Full Tower	55
300W for Full Tower	79
550W for UPS	279
1200W for UPS	659

PC POWER COOLING

Standard 220 for desktop / full tower	85
Silencer 270	
- for slim, baby or mid tower	149
- for AT desktop / full tower	165
Turbo-Cool 300	
- for slim	149
- for desktop / full tower	175
Turbo-Cool 450 for desktop / full tower	325
InnerSource 2210 UPS for full tower, Int, 95-132v, 220W DC, 100W AC, =550VA Ext UPS	299
Novell Network Interface	
- for InnerSource 2210 UPS	55

TRIPP LITE

BC 500 Lan (UPS, 350W)	215
BC 900 Lan (UPS, 650W)	365
Omni 450 Lan (UPS 325W + Line Regulation)	295
Omni 600 Lan (UPS 425W + Line Regulation)	385
Omni 900 Lan (UPS 650W + Line Regulation)	545

17. PRINTERS

BROTHER

HJ-400 Desktop Ink Jet for PC or Mac	329
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CANON

BJ-200	(after rebate 299)/349
BJ-300 desktop	349

CITIZEN

GSX 145 (24 pin, 132 column)	355
- Color Option for GSX 145	65
- Color Option for GSX 130	45
GSX 230 Fonts & quiet	249
GSX 240 Scalable Fonts & quiet	295
PN48 notebook, 1ppm, 2lb, battery, case	309

MICROTEK

TrueLaser MTP-306 6ppm, 2MB, 35 fonts	1195
HP (HEWLETT PACKARD) LaserJet w. toner	
Desk Jet 500 / 500C / 550C	379/499/699
Laser Jet IIIP	849
Laser Jet 4 / 4M / 4L / 4Si	1359/1865/685/3295

LASER MASTER

Win Printer 800 (Postscript)	1095
Win Printer XL600 11x17, 600x660PPI	2395
WinJet 800 Postscript for HP II, IID, III, IiD	475
WinJet 1200 Postscript for HP 4	775

PACIFIC DATA PRODUCTS

ProTracer Inkjet, A to C size output, 360dpi, i960RISC processor, 512K, 45dBA	1125
- Postscript emulation card	375
- HP-GL emulation Card	315
- Sheet Feeder I / II	135/115
- Ink Cartridges	19.50

PANASONIC

1123 / 1124 / 1624	195/259/349
- Auto Sheet Feeder for 1124 KX-P36	120
2023 24pin, quiet printer	199
2123 24 pin, 43.5dBA, color capability	239
2124 24 pin, 43.5dBA, color capability	319
2624 24 pin, quiet printer, 46.5 dBA	375
2180 9 pin, 45 dBA, color capability	159
Color upgrade Kit KX-PCK11	49
Single bin cut sheet feeder KX-PT10	95
32K Buffer dot matrix printers KX-P43	65
Serial interface card PS-13	75
4410 Laser, 512K, 5ppm	599
- Corona KX-PCR3	45
- Developer KX-PDP4	105
- Drum KX-PDM4	89
- Extra cassette KX-PKC2	45
- Fuser unit KX-PF55	105
- Optional second cassette KX-P495	135
- Toner KX-P453	35
- Fonts Card KX-P47x (for Lasers)	95
4430 Laser, 1 MB, 5ppm	685
- Accessories same as 4410	
4420 Accessories	
- Developer KX-PDP2	95
- Drum KX-PDM2	99
- Envelope Tray KX-P431	59
- Legal Tray KX-P425	45
- Ozone Filter KX-PFT2	26
- Toner KX-P451	39
4450 Accessories same as 4450i	
4450i Laser, 11ppm	995
- Developer KX-PDP1	95

- Drum KX-PDM1	145
- Envelope Tray KX-P430	59
- Legal Tray KX-P420	45
- Ozone Filter KX-PFT1	29
- Toner KX-P450	35
4455 Postscript, 11ppm	1695
- others same as 4450i	

QMS (Adobe Postscript)

QMS-PS 410 4ppm, 2MB, 45 Fonts	1275
- Envelope / Legal / Letter Tray	69/69/69
- Lower Cassette w. Letter Tray	149
- Toner	95

SEIKO

Smart Label Printer Plus (IBM/APPLE)	149
Smart Label Printer Pro	245
Box of Label (2 rolls per box)	10.95

TEXAS INSTRUMENTS

Micro Writer PS17 / PS35 5ppm	935/1195
XLPS 17 16ppm	1895
- Apple Talk Kit	99

Laser Printer Accessories:

COMPUTER PERIPHERAL

Jet Page (for HP II)	195
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HP

Envelope Feeder for IIID (special)	(245)
Optimal 500 sheet Legal Letter A4 (Jet 4)	279
Envelope Power Feeder 75 sheet (Jet 4)	279
Lower Cassette w. letter tray for IIP, IIIP	149
Toner for Jet II, III	79
Toner for Jet IIP, IIIP, IIIP	66
Toner for HP4	109
Postscript for Jet 4	399

IQ ENGINEERING

True Type Master Library	29
Super Cartridge 2 & 2LC	239
Super Cart. 3 Pro+ for HP III, IIID, IIIP, IIISI	199
Desk Jet 500 / Desk Jet Plus Professional	99

PACIFIC DATA

25 in One! (for Deskjet 500)	99
25 in One! III	
- for HP II, IID, IIP, IIP+, III, Microtek	245
Complete Font Library for HP III, IIID, IIIP	255
Font Bank for all HP Laserjet (New)	
stores soft fonts, 0.75MB / 1.5MB	205/269
Headlines Cartridge for HP II, IID, IIP	185
Paidic Connect XI	
- For HP II, IID, III, IIID	
-- 5 port 256K / 1MB (4S, 1P)	319/389
-- 10 port 256K / 1MB (10S)	449/519
- For HP 4, IIISI, Paint Jet XL300	
-- 7 port 1MB / 4MB (6S, 1P)	449/649
-- 10 port 1MB / 4MB (10S)	519/719
Pacific Page & 2MB (Postscript for HP II)	389
Pacific Page II / XL (Postscript for HP II)	719
Pacific Page P.E. (HP IID, IIP, IIP+, III, IIID, IIIP)	279
Pacific Page P.E. & 2MB	405
Pacific Talk	179
Pacific Page PE XL (HP IIP, IIP+, III, IIID, IIIP)	
Postscript w. 2MB & accelerator board	719
Plotter in a Cartridge (HP II)	225
Plotter in a Cartridge P.E.	
- for HP IID, IIP, IIP+, III, IIID, IIIP	225

PELICAN All type ribbons visit us

18. SCANNER

TAMARACK

ArtiScan Flatbed 24bit color 256 gray levels	
- w. Publisher 600/800/1200 dpi	895/1145/1775
- w. Pub. & OCR 600/800/1200 dpi	945/1195/1825
- w. Photostyle 600/800/1200 dpi	995/1245/1875
Slide Scan Kit (transparency, slide, X-ray)	
- 600/ 800/ 1200 dpi	525/525/595

MICROTEK

Scan Maker IIIX w. PhotoStyler	1150
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Hand scanners see Logitech in # 14

E-TECH

4256G 256 gray scale (w.OCR)	99(115)
4200C 256/4096 color (w.OCR)	269(289)

19. TAPE BACKUP

COLORADO

DJ-10 (120MB) QIC-40 w. cable	145
DJ-20 (250MB) QIC-80 w. cable	199
- AB-11 Ext tape port	45
- Cable (2 Floppies & tape back up)	9
- FC-10 Controller	95
- KE-09 Ext Kit w/o controller	75
- TC-15 controller w. data compression	195
- Unix/ Xenix driver for DJ-10, 20	99
PowerTape PT-25 2GB 300KB/s Int	995
PowerTape PTE-25 Ext	1125
PowerTape PT-50 4GB 300KB/s Int	1525
PowerTape PTE-50 Ext	1655
Trakker 250MB Ext (printer port)	399
Trakker 120MB Ext (printer port)	299

HILITE (Archive s/w included)

California 250MB, 3.5", 1" ht.	165
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IOmega

Tape 250MB Insider, 3.5", 1" ht.	199
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MICRO SOLUTION

120MB Ext (printer port)	299
250MB Ext (printer port)	389

SUMMIT

SE250 250MB w. Central Point Backup	199
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20. VGA CARDS

Hauppauge Win/TV-02 (122 channel tuner)	450
- Adapter Cable / S-Video Kit	52/85
INTEL Smart Video Recorder	535
Paradise Window Accel 31X 1MB	159
Standard 24 VLB 1MB	105
Video Plus (video image grabber)	275
(All cards 1024x768 except as stated)	
CGA / MGP card (Monographic w. Printer)	29
ET4000 Tseng Lab 1MB	95
ET4000 Tseng Lab VLB 1MB	129
Oak067 Super VGA 512K	52
Oak077 Super VGA 1MB	65
STB Super VGA 1MB	99

AMI

FastView EISA VGA Graphics 1MB	269
FastView P9000 VLB 2MB	395

ATI

VGA Stereo 51

(GROUP B Continue...)	
Jets and Props (Media clips)	29
Jones in the Fast Lane	29
King Quest V	29
Media Music Shop	29
Mixed-up Mother Goose	29
Monkey Island	29
Multimedia Music Training	25
PC SIG Games	34
Reference Library	35
Sleeping Beauty	35
Space Adventure	29
Stellar 7	29
The Animals / MPC	29/35
The Adventure of Willy Beamish	29
Time Table of History	29
Who Kill Sam Rupert	29

GROUP C

Choose any 3 titles for \$99	
All American Sports	39
Arthur's Teacher Trouble (oem)	35
Business Background	35
CD Fun House (350 games)	39
Corel Artshow 3 (Book + CD)	39
Electronic Library of Art (Western Arts)	35
Essential Home & Business Collection	39
Golden Immortal	39
Greatest Books Collection / for Win	39
Hound of Baskervilles	37
LOOM	37
Macromedia ACTION! WIN	35
Mammals (National Geographic)	35
Master Piece Library	35
Mavis Beacon Teaches Typing MPC	39
Mayo Clinic Family Health Book	35
Pacific Islands	39
Phoenix Shareware v2.0	35
Secret Weapons of the Luftwaffe	35
Space Quest IV - Roger Wilgo (oem)	35
Talking Class Tales	35
Talking Jungle Safari	35
US Atlas w. Auto Map	35
Where in the World is Carmen Sandiego	35
Wing Commander w. Ultima 6	35

BUNDLE

5 PACK #1	135
Compton's Multimedia Encyclopedia for WIN	
Guinness disk of Record MPC	
Reference Library	
Time Table of History - Science	
Wing Commander w. Ultima 6	
5 PACK #2 (Windows)	105
Chess Master MPC	
Grollier's New Multimedia Encyclopedia	
Mavis Teaches Typing	
World Atlas or US Atlas	
Wizard MPC	
5 PACK #3 (DOS)	99
Atlas Pack (US & World)	
Reference Library	
The Animals	
Secret Weapons of the Luftwaffe	
Software Toolworks Encyclopedia 5.0	
CD DELUXE (4 Titles)	55
Chess Master	
Mavis Teaches Typing	
US & World Atlas	
MULTIMEDIA BUNDLE of 4 (w. 6 titles)	115
Microsoft Bookshelf for Windows	
Microsoft Works for Windows	
Sherlock Holmes I	
Software Library:	
- Authorware Star	
- Macromind ACTION!	
- Mathematical Tempa	

OTHERS

7th Guest	49
Amanda Story	45
Amazing Universe	49
Anabel's Dream - Egypt	59
Arthur's Teacher Trouble / w. box	35/45
Atlas Pack (world & US) - DOS / MPC	35/39
Battle Chess Multimedia - DOS / MPC	29/49
Beauty and The Beast / w. box	22/35
Bible Library (oem)	49
CD Game Pack (10 games)	35
CD Power (shareware)	35
CD Source Book of American History	85
Compton's Family Encyclopedia / w. box	49/175
Compton's Interactive Encyc. WIN	245
- upgrade	99
Compton's Multimedia Encyc. WIN oem	65
DARWIN	75
Dictionary of Living World / w. box	45/115
Dinosaur Adventure / w. box	35/49
Distant Sun for Windows	79
Dr. T's Composer Quest / w. box	49/59
Electronic Home Library	45
Global Explorer (DeLORME)	99
Goldilocks and the 3 Bears (Eng/Fren/Spain)	45
Grammy Awards	45
Great Literature (1896 books)	49
Great Wonders of the World	55
Grollier's New Multimedia Encyc. WIN 1.5	75/225
Guinness Disc of Record / w. box	29/35
Heart the Engine of Life (about human body)	75
Information USA Government	65

JAZZ of Multimedia History	69
Just Grandma and Me	39
Kodak Photo CD Access (DOS & WIN)	35
Laser Printer Companion	39
Learn to Speak Spanish	69
MacMillan Dictionary for Children (K-12 grade)	45
Mario is Missing + World Atlas	35
Microsoft CINEMANIA	55
Microsoft ENCARTA	255
Microsoft Multimedia Beethoven 9th Symphony	55
Microsoft Multimedia Bookshelf / 1993	45/125
- upgrade to 1993	49
Microsoft Musical Instruments	55
Microsoft Works MPC	45
Mixed-up Mother Goose / w. box	29/45
Monarch Notes (over 2000 study guides)	49
Monster Disk II (2 shareware disk)	55
MPC Wizard (test & tune-up for Win)	15
Multimedia Animals Encyclopedia	59
Murder Makes Stranger Dead Fellows	49
Nautilus BackPac (6 disk)	55
New Basics Electronic CookBook	45
Old Testament	59
Oxford English Reference Library	99
PC SIG Library vol.11	45
Peter and the Wolf / w. box	22/35
Phoenix Shareware v3.0	49
Picture Atlas of the World	105
Pilgram Quest	75
Pixel Garden	35
Playing w. Language / w. box	35/45
Prescription Drugs	59
Pro Phone 93 (3 disk) / (7 disk)	69/139
Publish It	49
Q & A v 4.0	49
Quick Art Lite	85
Return to the Moon	49
Shareware Gold II	57
Sherlock Holmes I / II	29/49
Software Toolworks Encyclopedia (DOS)	55
Space Quest IV - Roger Wilgo / w. box	35/49
Stories of Murder, Mystery, Magic & Terror	39
Street Atlas (DeLORME)	99
Talking Schoolhouse	65
The Family Doctor / w. box	35/55
The World of US Manga	45
Think and Talk Spanish (Fren/ Italian/ Ger)	115
Timetable of Arts & Entertainment	35
Timetable of Business & Politics	55
Ultimate Shareware	45
US History	49
Voyage to the Planets 1 / 2 / 3	55
Where in the World is Carmen San Diego	35/65
Wing Commander w. Secret Mission 1 & 2	55
World Vista	49

2. PC SOFTWARE

ADOBE (special)

Illustrator 4.0 WIN / w. Streamline	359/425
PhotoShop 2.5 WIN	499
Streamline for WIN (special)	(95)125
Plus Pack for Mac / WIN	99
Type Align	59
Type Cartridge 1/ Type Cartridge 2	79
Type Manager for WIN 2.5	67
Type Set 1/2/3 for WIN	65/65/109
Type Set: Overheads & Slides	75
Type Set: Spreadsheets & Graphs	75

AUTODESK

AutoSketch 3.0 DOS (special)	(99)115
AutoSketch for WIN (special)	(155)175
Generic CADD 6.0 (special)	(249)285
Generic 3D (special)	(179)
Graphic Impact	85
Instant Artist	39
Home Series (Home/Landscape/Kitchen/Deck)	39
Multimedia Explorer	115

BORLAND

Brief 3.1 for DOS & OS/2	99
C++ for OS/2	149
C++ Professional 3.1 for WIN	319
C++ 3.1 for WIN & Application Frameworks	485
dBase IV v2.0 for PC (new)	499
ObjectVision 2.1 / ObjectVision Pro 2.1	102/335
Office Pack for WIN	
(paradox + quattro pro + wordperfect)	395
- Upgrade	295
Paradox 4.0 DOS	499
Paradox for WIN (special)	125
Quattro Pro WINDOS / WIN/ 4.0 DOS	99
SuperPack (Quattro Pro & Paradox) WIN	195
Screenery (Windows wallpaper, screen saver)	25
The World of C++ (Video Training Kit)	85
Turbo C++ for DOS 3.0 / WIN 3.1	75/105
Turbo C++ Visual Edition for WIN (special)	79
Turbo Debugger & Tools 2.0	99
Turbo Pascal 7.0 / 1.5 for WIN	115/109

CENTRAL POINT

Anti-Virus 1.0 for DOS / 1.2 for WINDOS	15/39
PC Tools 8.0 DOS / 1.0 for WIN	115/119

INTUIT

Quicken for DOS 6.0/ WIN 2.0/ MAC 3.0	45
Quicken Companion	17
QuickBook	87
QuickPay (payroll)	39
QuickBook & QuickPay	110

LOTUS

Improv - 12 data dimentions (special)	99
1-2-3 for WIN (special) / 4.0 for WIN	299/325
1-2-3 Rel 3.1+ for DOS / Rel 3.4 single	385
1-2-3 for DOS upgrade	105
Ami Pro 3.0 for WIN	229
- competitive upgrade	99
Freelance Graphic	299
- upgrade for DOS/WIN	99
Lotus Organizer (special)	(99)
Smart Suite (123 win, Ami, Freelance, ccMail)	450

MICROGRAFX

Designer 3.1	355
Graphics Works for WIN	125
Picture Publisher 4.0 for WIN	399
Windows Draw 3.0	49/69

MICROSOFT

DOS 3.3 / 4.01 / 6.0 (new)	29/19/49
- upgrade to 6.0 (special)	(49)79
ACCESS (special)	(89)325
- Upgrade to 1.1 / Competitive upgrade	15/149
Entertainment Pack for WIN 1/ 2/ 3/ 4	28
Excel 4.0 for WIN (special)	(285)299
- upgrade	125
Flight Simulator	39
FORTAN 5.1 (special)	279(105)
Fox Pro 2.5 Distribution Kit DOS / WIN	319
Fox Pro 2.5 Single DOS / WIN	315
Fox Pro upgrade to 2.5 DOS / WIN	(99)
Macro Assembler v6.1	129
Money for WIN 2.0 (special)	49(15)
Office for WIN 3.0	469
PC Mail Server for DOS & WIN (10-user)	435
Power Point for WIN	299
- upgrade	125
Profit for WIN	129
Project 3.0 for WIN	419
- upgrade	145
Publisher for WIN	125
Quick Basic Compiler 4.5	129
Quick C for DOS / WIN	69/125
Sound System for WIN (w.16 bit Audio card)	199
Sound Bits (Cartoons/ Hollywood/ Musical)	29
Test for WIN	249
True Type Font Pack 1/ Pack 2 (HP printers)	49
Video for WIN (CD & floppy)	129
Visual Basic 3.0 for WIN	129
- Upgrade	55
Visual Basic Professional 3.0 for WIN	(249)315
- Upgrade / Competitive upgrade	99/195
Visual C++	129
Visual C++ Professional	309
- upgrade	135
- competitive upgrade	189
Windows 3.1	65
- upgrade	45
Windows 3.1 Device Driver Development Kit	315
Windows Printing System	135
Windows for Workgroups	165
- Workgroups Add on (to WIN 3.1)	69
Windows for Workgroups Add on Starter Kit	310
- Workgroups Add on 1 User Kit	159
Word 6.0 DOS	315
Word for Windows (special)	(285)299
- Word for Windows upgrade	125
Works 3.0 (new)	99
Works for WIN 2.0 (special)	(99)125
- competitive upgrade (WIN)	79

QUARTERDECK

DesqView 286	59
DesqView 386 v2.4	129
DesqView / X	165
DesqView / X Network Manager (TCP/IP)	129
Qemm 386 v6.0	59
QEMM - Game pack	85

SANTA CRUZ OPERATION (SCO)

SCO C++	915
SCO ODT Dev. System 2.0 / Tape	1475/1250
SCO ODT Personal System 2.0/ Tape	1170/1066
SCO XENIX-NET 386 single server v1.3.0	675
UNIX 386 Dev. System v 3.2.4	899
UNIX 386 GT Oper. Sys v 3.2.4 Multiuser	899
XENIX 386 Dev. System v 2.3.1	599
XENIX 386 GT Oper. Sys v 2.3.4 Multiuser	650

SYMANTEC

Norton	
- Anti-Virus 2.1 (new)	79
- Backup v1.2 / v2.0	49/95
- Desktop 2.2 for WIN	105
- Commander (special)	(85)
- Q & A Write (Word Processing)	49
- Speed Cache + (Speeds WIN, DOS & CD)	69
- Utilities 7.0 / purchase w. DOS 6.0	109/99
On Target for WIN	89
PC Anywhere 4.5 Remote and Host	115
PC Anywhere Lan Complete	385
Q & A	239
Time Line 5.0 / for WIN	445/445
Time Line Lan Pack	379

WORDPERFECT

DataPerfect / DrawPerfect	265
LetterPerfect 1.1	95
PlanPerfect	235
WordPerfect 5.1 (DOS)	259
- upgrade for DOS 5.1	79
- competitive trade up 5.1 for DOS	105

WordPerfect 5.2 for WIN	265
- upgrade Kit to 5.2 for WIN	40
- upgrade to WIN 5.2 from DOS	85
- competitive trade up 5.2 for WIN	105
WordPerfect 6.0 DOS (new)	275
- Upgrade	109
WP Executive	145
WP Office 3.1	95
WP Works	99
WP Presentations (w.Sound Blaster)	295

OTHERS

3-D Charts to go (special)	(35)
ACT 1.2 / 2 user / for WIN	225/335/235
After Dark for WIN (screen saver)	27
ALDUS	
- Freehand 3.0 for WIN	379
- PageMaker 4.0 for WIN (free upgrade 5.0)	455
- Persuasion 2.1 for WIN	325
- Photostyler 1.1 for WIN	515
Asymetrix Multimedia Make Your Point	65
Automap (road atlas) / for WIN	49/59
By Design for WIN	59
Body Works	39
Boot Con (solve compatibility problems)	49
CALERA Wordscan 1.1 / plus	182/425
Carbon Copy 6.1 Guest & Host / for Win	112
C - It 3.0 (for C/C++)	99
ClarisWorks for Windows	99
Clipper 5.2	479
- upgrade	115
Check-It plus	82
Corel Draw 3.0 (special)	(135)
Corel Draw 4.0 / CD version	385/365
Da VINCE eMail 2.0 , 10 user (special)	485(295)
Dash Board for WIN (HP)	45
Direct Access 5.1 / for WIN (new)	63/45
DOS 5.0 (IBM)	39
DR DOS 6.0 + NetwareLite 1.1	65
Display Faces	77
EasyDOS (menu for WIN)	25
Energizer Bunny (screen saver)	19
Facelift for WordPerfect / for WIN	59
Family Bible	25
Fastback Plus 3.1 (special) / for WIN	89/107
Fax Grabber 1.2	72
Faxit DOS & WIN	69
Fax Master for WIN (special)	(79)
Fax Scanner	55
Fax Scanner w. Type Reader OCR	175
File Maker Pro 2.0 for WIN (special)	(125)259
Font Minder for WIN	55
Fractal Design Painter 2.0 WIN	255
Frame Maker 3.0 (special)	(385)485
- competitive upgrade	299
Full Motion Video MATINEE (screen saver)	29
Geoworks Pro	119
GDI Flash Form	55
GDI Wind Form	69
Grammatik V for DOS / WIN	57
Hardvard Graphics for WIN	375
Hardvard Graphics 3.0 for DOS	399
Hijaak 2.1 / for WIN	115/125
Hijaak PS	199
Hollywood for WIN (special)	99
IBM OS/2 2.1 / CD version	155/139
- upgrade / CD version	105/89
Johnny Castaway (Screen Antics)	19
LapLink Pro v5	105
- upgrade	55
Mac Print	75
More Fonts	77
My Product Invoice	45
Omni Page Professional WIN 2.1	599
PFS: First Choice	79
Pacioli 2000 (special)	15
PC Swimsuit Calendar DOS / WIN	25/27
Peach Tree Accounting for WIN	75
Power Search (File Manager)	55
PrintShop Deluxe - Business	29
Procomm Plus 2.1 / for WIN	69/95
Professional Draw	269
- competitive upgrade	129
QA Plus 4.7 / for WIN	89
Quark X Press 3.1 for WIN	569
Right Writer 5.0 / for WIN	45
SpinRite III	79
Stacker Data Compression 3.0	95
- upgrade	55
Star Trek (WIN Screen saver)	37
Super PC-Kwik	59
Superstor 2X	59
Superstor Pro 2X	79
The Far Side (computer calendar)	15
Time Slip v5.0	189
Turbo CAD v3.0 (design & drafting)	85
UpFront for WIN (special)	(199)299
Ventura Publisher 4.1 (new)	499
- Ventura Publisher 3.0 + upgrade 4.0	399
- Ventura Publisher 4.1 Education special	199
Vista Pro	69
VISIO for WIN (shapeware)	195
Wave for WIN	75
Winfax Pro 3.0 (new)	85
Will Builder	15
XTree Gold 2.5	89
XTree for WIN 1.0 / 1.5	49/65

Educational Software & Games (on sale) ■

USER GROUP NETWORK

BULLETIN BOARDS

MULTI-ZONE

Adventures Online.

(408)985-1529, 732-4908; (415)321-3661, 365-7002; 573-1063, 244-9218; (510)797-4101. 24 hrs., Multi-user, interactive D&D style fantasy adventure game (similar to MUDD), chat on 12 lines. [Exp. #112.]

Dating Tree BBS.

(408)946-1431; (415)349-0961; (510)430-8675. 16 lines, online chat, email, matchmaking. Call for more access numbers. [Exp. #112.]

HoloNet Internet Access

BBS. (510)704-1058; call for other nationwide numbers. 8-N-1, 24 hrs., 1200/2400/9600/14,400. Internet: telnet, FTP, IRC, MUDs. 3500+ Usenet groups. Free demo. [Exp. #111.]

Interactions BBS.

(408)258-8913, (415)469-5510, (510)832-0560. 12 line friendly chat (over 18 only), two-week free trial. Sysop: C. Watson. [Exp. #110.]

Lambda. (415)572-2591, 755-9439; (510)268-9891. Adult, mostly gay/lesbian, all are welcome, email, chat, matching. Free. [Exp. #112.]

Portal Communications.

(408)725-0561, (300-

2400); (408)973-8091, (9600-57,600); (415)965-8059, (300-57,600). Worldwide X.25 online, shell, BBS & UUCP connections. Voice: (408)973-9111. [Exp. #111.]

Pro-Line BBS. (408)226-3880, (510)888-1130. 24 hrs., Chat, matchmaking, database lifestyles, email, and more. [Exp. #112.]

SF Net. (415)824-8747, 589-2194, 332-3923, (510)450-0155, 638-8644. Coffee House/Cafe Connection, 32 lines, public terminals, chat, matchmaker, msg areas, Fido 1:125/824, Internet mail. Voice: (415)695-9824. [Exp. #111.]

209

BerthaBoard. (209)823-0093. 1200-14,400. Two lines, 5.2GB, 70,000 files, lrg. msg. base. [Exp. #110.]

Extacy BBS. (209)962-4045. Adults only, four lines, 6000 files, and free adult video tape to new members. [Exp. #110.]

408

#1 Fun Seekers. (408)379-0958, 379-9680. 8-N-1, 24 hrs., IBM, lots of adult/other files, online games, classified ads, msg base. [Exp. #110.]

A32 Macintosh User Group BBS. (408)378-8252. 24

hrs., 2400. Mac, First Class, members only. [Exp. #112.]

Amateur Action BBS.

(408)263-3393. 14,400. 100% Adult Amateur GIF files, 16 lines. [Exp. #112.]

Applied Knowledge BBS.

(408)733-9341. 8-N-1, 14,400. Free stock price forecasts on 6000 NYSE, AMEX, and OTC stocks. Free access. [Exp. #111.]

Atlantis BBS. (408)377-8510. 8-N-1, 24 hrs., 2400. 12 lines, multiplayer games, national chatlink 7-10 pm, CD-ROM files. [Exp. #110.]

Bay Area Atari User Group BBS. (408)986-0215. 8-N-1, 24 hrs., 300/1200/2400. [Exp. #111.]

BayNar-Net. (408)926-8547. 24 hrs., 2400. Model rocketry, astronomy, IBM programs, family-oriented, NAR affiliated. Sysop: Phil Hayton. [Exp. #112.]

BayVAC DEC LUG BBS.

(408)776-4823. 9600. Log in as username GUEST, password GUEST for BBS information. Voice: (408)776-4978. Sysop: Rich Taylor. [Exp. #110.]

The Beggar's Tomb. (408)243-TOMB. GIFs, stories, and animation for adult orientations. Sysop: The Grim Reaper. [Exp. #110.]

Burn This Flag. (408)363-9766. 2400/9600. Esoteric text files and message sys-

tem from closet Luddites. San Jose, two lines. NIRVANAnet. [Exp. #111.]

Code Room. (408)266-3818. 8-N-1, 16,800. A Programmer's BBS: complete support for OS/2 2.x, tons of C files, Fido and FxNET msg networks, and Fun Doors. Sysop: Ramin Akhbari. [Exp. #111.]

Comp-U-Ease. (408)286-8332. Engineering and CAD, related files and topics, hum for RIME email network. [Exp. #111.]

Cruzio. (408)423-9995. 8-N-1, 1200/2400/9600/19,200. Santa Cruz, email, USENET newsgroups, calendar, agency & gov't. directory listings. Sysop: Chris Neklason & Peggy Dolgenos. [Exp. #112.]

The Electric Pages.

(408)253-4280. 300/1200/2400. Commercial and private advertising. Select by category or key words. Voice: (408)253-1709. Sysop: Contemporary Communications, Inc. [Exp. #111.]

Escape To Other Worlds

BBS. (408)956-1750. 8-N-1, 1200/2400/9600/14,400. SF/fantasy, comics, games, RIME. Three lines, D/L files. Mac and PC GIFs, 1.8GB. [Exp. #111.]

The Harper's Inn BBS.

(408)734-9448. 24 hrs., 14,400. Lots of doors, mes-

BAY AREA BBSes

By Kathleen Creighton

Virtual Vacations

No time for a vacation? You can take a tour online for the price of a few phone calls without having to pack a suitcase. You're on your own for postcards, though.

GUIDEBOARD BBS

Guideboard BBS, "a combination of Cabbie's Guide to San Francisco and consumer bulletin board—a potpourri of information on where to go for what," has been reviewed here before. But since San Francisco is the number one tourist destination in the US, we can start the vacation right here.

Sysop Richard Schwartz is a cabbie who shares information gained on the job and asks callers to contribute their best San Francisco tips, such as "best San Francisco restaurant," to the information base. Feel the virtual fog as it blows in the Golden Gate. (415/864-3858, 2400 baud, 8N1.)

TECH BBS

How about a trip to the Tech Museum of Innovation BBS in San Jose? (408/279-7199, 2400 baud, 8N1, 5:30 pm to 9:30 am PST.) Get information about the museum or the BBS, read the calendar of upcoming events, learn about exhibits, programs, volunteering, and the TechMOOseum, the Tech's text-based virtual world, and about MUDs (multi-user dimensions) in general.

IISME-II NET

If you're a teacher or have children in your vacation party, check out IISME-NET, serving the Industry Initiatives for Science and Math Education program of the San Francisco Area and any interested educators, industry people, and students. (510/643-6258, 2400 baud, 8N1, sysop Bob Shayler.) IISME is a partnership of Bay Area industries and UC Berkeley's Lawrence Hall of Science, whose broad aim is to improve the quality of science and mathematics education. Bay Area sponsors represent electronics and high-technology companies as well as government agencies, research labs, health care organizations, financial institutions, and retail firms. For further information about IISME, call the IISME office at the Lawrence Hall of Science: 510/643-6258. IISME-NET is a part of K12net and FIDOnet K-12.

WINE TASTERS' BBS

Ah, this is more like it—a modem trip to Sonoma, Napa and Mendocino County wineries. This trip has the added advantage of designated dialing. Download your own travel guide by using this BBS's automated winery database. A request for "Russian River" gave me an executable file containing a list of Russian River Valley wineries, a Healdsburg summer concert series

Continued

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BBSes continued...

sages, JetNet node, VGA Planets. Sysop: Bugs. [Exp. #110.]

HeartBeat Earth. (408)257-2306. 300/1200/2400. The South Bay's Environmental and Quality of Life Information service. [Exp. #110.]

Higher Powered BBS. (408)737-7040. 2400-16,800. Multiline, voted in Top 100 BBSes in World. Over 300 ILink, SmartNet, Intelc, SFNet conferences. [Exp. #111.]

Hot City. (408)848-6681. 300-19,200. Seven lines, 2.4GB, 1800+ USENET subs, Fido, RBBS, and more. Auto call back, San Jose area, after validation. [Exp. #110.]

LaserLight BBS. (408)496-0771. 8-N-1, 24 hrs., 2400/9600/14,400. IBM, best games in town! Apogee, EPIC, Moraff & MVP Release site. Sysop: Robert Mueller [Exp. #112.]

Mail Stop BBS. (408)257-1919. 8-N-1, 24 hrs., 300/1200/2400/4800/9600. Free, private email and SIG system. Internet mailboxes

avail. Sysop: Dcarter. [Exp. #111.]

Mongoose BBS. (408)733-3034. 1200/2400/9600/14,400. SmartNet, adult files, latest shareware files. Free access. Sysop: Robert Yagmourian. [Exp. #112.]

Monterey Gaming System. (408)655-5555. 300/1200/2400/9600/14,400. 20 lines, conferences, msgs., custom games. Free. [Exp. #111.]

Moose Is Loose BBS. (408)773-9573. A fun place to message other adults. Sysop: John Giever. [Exp. #112.]

Nasty Playmates. (408)374-2627. Adult social dating, all preferences, matchmaker, personal ads. Attach GIFs/files to mail. [Exp. #112.]

Nitelog BBS. (408)655-1096, 655-8294. 24 hrs., 300-16,800. DOS/Windows/OS2 adult files, 20 lines, 6.3GB. Sysop: Karl Van Lear. [Exp. #112.]

Paradise City BBS. (408)280-6630. 1200/2400/9600/14,400. two

lines. Tons of files and doors. Free full access on first call. Sysop: Jim Reed. [Exp. #111.]

PC-SIG BBS. (408)524-9835. 8-N-1, 24 hrs., 2400/9600/14,400. PC-SIG entire software library plus all new programs reviewed on Shareware Magazine. [Exp. #112.]

Personal Quest/Gaming BBS. (408)253-1367. 24 hrs., 1200/2400. Sports, gaming, handicapping conference. Womens World conference, HIV+ only conference. [Exp. #111.]

PIM Data Line! (408)448-3060. 8-N-1, 14,400. Win games, fonts, utils. MicroPatent support. All free. Sysop: Wayne C. Brown. [Exp. #112.]

The Real Estate Network. (408)956-1961. 8-N-1, 24 hrs., 2400. Services include financing, relocation, and messages. Search for agents, property ads, and open houses. Free. [Exp. #110.]

The Roadkill Grill. (408)985-0213. 1200/2400. Fidonet/OtherNets. 5 nodes, lots of loony people. Free access. Sysop: Bryce Wolfson. [Exp. #111.]

Ring Of Fire BBS. (408)739-8753. Home for United Sysop's Association and Silicon Valley Novell Users Group. Since 1982. Hub for USAnet. Sysop: Bill Strouse. [Exp. #111.]

The Rising Storm. (408)739-8693. 8-N-1, 14,400. Emergency prep., firearms, politics, and more. Survival echos and files. Sysop: Kirk DeHaan. [Exp. #110.]

Risque Business. (408)776-1841. 14,400.

Premium adult graphics. [Exp. #110.]

San Jose Connection. (408)956-8819. 8-N-1, 24 hrs., 300/1200/2400/9600. Fidonet 1:143/111. KinkNet 69:1000/111. Many msg areas, files, job listings, all orientations, adult, and teens. Free. Sysop: Eral & Manuel. [Exp. #111.]

The Shrine BBS. (408)747-0778. 9600. Magick, religions, sex, and more. Adult and women only areas by request. Free system. Sysops: Junell Zzz and Tom Zoch. [Exp. #111.]

ShrinkTank BBS. (408)257-8131. 8-N-1, 24 hrs., 300/1200/2400/9600/14,400. Mental Health, Psychology, Men's Issues, Recovery conferences. All users welcome! Sysop: Rob Bischoff, Ph.D. [Exp. #111.]

The Silicon Connection. (408)492-9700. 24 hrs., 300/1200/2400. Electronic PenPal Network, 20 lines. [Exp. #111.]

The Silicon Valley Christian Connection. (408)246-7002. 300/1200/2400/9600/14,400. NewLife Net, Christ World Echo Mail, files, MIDI, GIFs of the Holy Land. Free access. [Exp. #112.]

Smorgasbord BBS. (408)722-9101. Aptos, Watsonville, Gilroy. 25,000 IBM/Mac files, matchmaking, WNET. [Exp. #111.]

Softwaremania BBS. (408)238-1681. 8-N-1, 300/1200/2400/9600/14,400. New! Games, utils, multimedia, GIFs, Win 3.xx, sound, and more. Sysop: Tony Luu. [Exp. #111.]

Spectral BBS. (408)443-8740, 443-9781. 24 hrs., 1200/2400/9600/14,400. Free D/L's, 8GB adult files, doors, and more. [Exp. #110.]

The Support Network BBS. (408)259-0297. 10:00 am-midnight daily, 8-N-1, 1200/2400/9600. Community computing for Santa Clara County. Sysop: Frank Arnold. [Exp. #111.]

Synar Chat STS-14. (408)929-1980. 24 hrs., 300/1200/2400. 12 lines, teleconferencing, nationwide linking. Free two week trial membership. Sysop: Joe Boo. [Exp. #112.]

The Tech BBS. (408)279-

schedule, and a VGA winery map of the area.

It's not the real thing, but if you're a fog bunny whose car doesn't have air conditioning, this is just the ticket for a summer wine country excursion. (415/279-7199, 2400 baud, 8N1.)

OUTDOOR ALMANAC

Time for a visit to the Emerald City? Dial up to Seattle for a look around public, state and federal parks, ferry schedules, weather and avalanche information (in-season) and more. There are lists of Seattle view points, public piers, boat launches, and other places of interest. (206/363-0195, 2400 baud, 8N1.)

MICKY'S KINGDOM BBS

If this trip has been too tranquil so far, dial up Mickey's Kingdom BBS in Moreno Valley, California. (909/242-3975, 2400 baud, 8N1.) There are several Disney special interest group echoes on various networks, but this BBS is totally devoted to things Mickey Mouse.

According to the sysop (who doesn't seem to have a name) "this BBS is dedicated to the true Disney enthusiast who craves to know anything and everything about The Walt Disney Company, as well as the Disney fan who is just looking for the latest price information and entertainment schedules at the Disney Theme Parks worldwide." Plans include bringing in all Fidonet-type and Usenet Disney message areas (there are several of them across the various networks).

HOORAY FOR HOLLYWOOD!

While we're in Southern California, why not a trip to Hollywood? Hooray for Hollywood! BBS hosts all kinds of discussion about the business (sysop Gene Gjesvold is a limo driver). Check out the file area for Monty Python skits. (213/653-7508, 2400 baud, 8N1.)

TRAVEL ONLINE

How about a virtual vacation in St. Louis in July? Travel Online, a huge BBS hosting eight BBS networks plus Usenet newsgroups, is a terrific example of what can be done by bringing all available special interest message areas together. (314/625-3874, 2400 baud, 8N1, Rik Brown, sysop.)

Brown's definition of "travel" is more virtual than real, and Travel Online is a full-service BBS for the St. Louis area, but the travel section is massive. There are TRAVEL echo areas from several networks, rec.travel, rec.travel.air and rec.food.restaurants from Usenet, world language echo areas, and what looks like might be all of the soc.culture.* (society/culture.country) groups from Usenet. Bay Area readers who've wondered what all the shouting is about regarding Internet/Usenet will begin to get the picture.

SUGGESTIONS?

I'm always looking for good column ideas and interesting and unusual BBSes to explore, so I'm happy to hear from you! Email me at casey@well.sf.ca.us. US mail sent to me in care of MicroTimes takes a while to reach me. ■

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BBS Column continued...

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Continued

7199. 8-N-1, 5:30 pm-9:30 am, PST. 300-19,200. BBS run by staff and volunteers of The Tech Museum of Innovation. [Exp. #111.]

Thunder Mountain BBS. (408)266-4553. 8-N-1, 300/1200/2400. Five lines, chat, email, matchmaker, files for all. Free. Sysop: David Alvarado. [Exp. #112.]

The Village. (408)229-6706. 2400/9600/16,800. Over 125 online games, 800MB, echo mail. Full access on first call. Sysop: Michael Wilson. [Exp. #110.]

The Virtual Reality BBS. (408)246-5434. 8-N-1, 1200/2400. Virtual/Net files, virtual reality games. Free. Sysop: Jim Busby. [Exp. #110.]

The Warrior Realm BBS. (408)287-3945, 287-0835. 8-N-1, 24 hrs., 300/1200/2400. Multiplayer doorgames & FRP, IBM files, and fun. Sysop: Mark Barrow. [Exp. #111.]

West Coast Swingers BBS. (408)946-7083, 946-7135. 2400/9600/14,400. eight nodes, three CD-ROMs, chat, swinger ads, adult. [Exp. #110.]

Zone BBS. (408)720-1152, 720-1153. 8-N-1, 24 hrs., 1200/2400/9600/14,400. FidoNet, RBBSnet, CircuitNet echomail. File area for Mac & PC users. Free. Sysop: Ron Schultz. [Exp. #110.]

415

After Hours Comm. (415)386-7372. 8-N-1, 24 hrs., 1200/2400/9600/14,400. Gay, Straight, Bi. XXX-graphics, animation, text erotica. Conversational

msg bases. [Exp. #110.]

AHA Hydrogen BBS. (415)494-3116. 8-N-1, 1200/2400/9600/14,400. Alt. energy info—prosperity without pollution. [Exp. #110.]

Airtight Garage. (415)641-0348. FidoNet msg. areas, SIGs in science fiction, motorcycling, etc. Free. Sysop: Carlos Benitz. [Exp. #112.]

ALIEN BBS. (415)359-8774. 8-N-1, 24 hrs., 1200-14,400. Amiga/IBM/Atari files and messages. Adult files w/registration. Free. Sysop: Ed Vandehey. [Exp. #110.]

Amiga Station San Francisco BBS. (415)824-8774. 24 hrs., 300/1200/2400. TBBS supporting the Commodore Amiga. Free reg. Sysop: Richard Gaikowski. [Exp. #112.]

Anatomically Correct BBS. (415)856-8425. 24 hrs., 2400. Discussions of adult issues, more than 100 stories. No GIF files. Sysop: Howieird. [Exp. #111.]

The Back Door. (415)756-6238. 24 hrs., 300/1200/2400/9600/14,400. 49 lines, separate Gay, Lesbian, and Straight sub-systems. 18 and over only. [Exp. #111.]

Bay Windows BBS. (415)755-2939. 9 am-11 pm, DOS, utils, email, Windows. Sysop: Judy. [Exp. #110.]

The Board With No Name North. (415)826-9626. 8-N-1, 24 hrs., 300/1200/2400/9600/14,400. Gay male BBS, chat, ONMChat, email, library w/GIFs & fantasy text. [Exp. #112.]

California Online! (415)331-4081. 9 lines, "California ChatLine", file/msg database, Internet, games. Free & reg access. Sysop: Jim. [Exp. #112.]

Charisma II. (415)802-9011. 1200-14,400. two lines, tons of files and conferences. Free reg 1st call. Sysop: Robert Maverik. [Exp. #111.]

The Classified BBS. (415)665-7918, 665-2475. 8-N-1, 24 hrs., 1200/2400/9600/14,400. For-sale, echo mail, files, and more. Sysop: John Suelen. [Exp. #111.]

Compool BBS. (415)948-8928. 1200/2400/9600.

IBM/MS-DOS file exchange, three lines, 2500+ files. Sysop: Andy Bajka. [Exp. #111.]

Computer Show Hotline. (415)340-9370. 8-N-1, 1200/2400. Latest Computer Show info. Complete list of dates, times, locations, and directions. [Exp. #111.]

Contractors Exchange BBS. (415)334-7393. 8-N-1, 24 hrs., 2400. Jobs, leads, software for the contractor. Sysop: George Salet. [Exp. #112.]

Corner UNIX. (415)564-8750. 8-N-1, 1200/2400/9600/14,400. San Francisco Public Access UNIX. Full USENET/Internet email. Sysop: Furryeel. [Exp. #112.]

CPP MultiMedia BBS. (415)665-1546. 24 hrs., 300/1200/2400/9600/14,400. Multimedia, GIFs, sound, Windows, credit help, pets. Sysop: Clements. [Exp. #110.]

The Cutting Edge BBS. (415)751-0588. 2400-16,800. 7+GB, 12 CD-ROMs, 70,000 files, online VGA multiplayer games.. Sysop: Evan Margolin. [Exp. #112.]

The CyberDen. (415)472-5527. 24 hrs., 1200/2400/9600. A gateway into the electronic world for those of the cyberworld. Sysop: xorcist@cyberden.sf.ca.us [Exp. #110.]

DPNet BBS. (415)788-8663. 8-N-1, 24 hrs., 300/1200/2400/9600. Free consultant job listings, Fidonet conferences, professional computing organizations, and technical SIGs. All welcome. [Exp. #110.]

The Elfspire Tome BBS. (415)595-2387. 1200/2400/9600. A Fantasy roleplaying G.M. resource bulletin board featuring roleplaying, games, fantasy clipart, and more. [Exp. #112.]

Fog City. (415)863-9697. 8-N-1. Gay & Lesbian community, chat, matchmaking, CD-ROMs, games, 2.4GB. Since 1986. [Exp. #110.]

Fun University Network (FUN). (415)327-4591. 8-N-1, 24 hrs., 300/1200/2400/9600/14,400. Current events, simulation games, and puzzles. Sub w/free intro. Sysop: Wendie, Mike, Lisa, and Scott. [Exp. #111.]

Golden Gate Computer Society BBS. (415)927-1216. 24 hrs., 1200/2400/9600/14,400. Four lines, ILink, CalLink, and USENET. d/I OK on first call. [Exp. #110.]

Graveyard Shift BBS. (415)923-9060. 2400/9600/14,400. AlladultXXX, GIFs, animations, texts, lr. msg. base, ThrobNet, SexNet. Free. [Exp. #110.]

Guideboard. (415)864-3858. 24 hrs., 300/1200/2400. Multiline, Cabbie's Guide to SF restaurants, doctors, auto repair, etc. Sysop: Dick Schwartz. [Exp. #110.]

The Hare's Nest. (415)883-4968. 8-N-1, 2400. Gentlemanly pursuits—flyfishing, golf, billiards. River info, USGA handicaps, and more. [Exp. #111.]

Hispanic OnLine Access. (415)252-0285. 8-N-1, 24 hrs., 300/1200/2400/9600/14,400. Hispanic issues, software, business. Free. [Exp. #112.]

IBBSWest. (415)564-9996. 8-N-1, 24 hrs., 300/1200/2400/9600/14,400. 4 lines, PC and compatibles, shareware, utils., adult GIFs, CD-ROM, 13,000 files. Fee. [Exp. #110.]

InfoDude Communications. (415)855-9500. 24 hrs., 2400/6900/14,400. Teleconferencing, Forums, IBM, Windows, Mac, and Amiga files. Private email. Instant reg., first 30 hrs free, \$3/mo. Sysop: Joseph A. Jenkins. [Exp. #111.]

The Informer BBS. (415)468-6713, 468-9913. 24 hrs., 2400-14,440. TCalNet, Intelc, FamNet, WindNet, Newlife, Operating Systems, Tech Specs, conferences. Subscription/free. Sysop: John Custer. [Exp. #111.]

International House Of Leeches. (415)897-8190. 300/1200/2400. Online games, 4GB of CD-ROMs, adult sections. Running T.A.G. Sysop: Vincent. [Exp. #111.]

The LaserBoard. (408)268-4863, 268-6323. 24 hrs., 14,400 RIME w/over 80 conferences, also local TNET and Wildnet conferences. Over 1GB. Sysop: Shawn Higgin. [Exp. #110.]

The Last Resort. (415)323-2616. 1200-19,200. 800+MB, GIFs, files, games,

CD-ROM. Free. Sysop: Kelvin. [Exp. #110.]

Lies Unlimited. (415)583-4102. 2400. Politics and polemics. NIRVANAnet. Instant access, no fee. [Exp. #111.]

Marin County Net. (415)331-6241. 24 hrs., 2400-16,800. Aviation, sailing, files, and conferences. two nodes. Free. [Exp. #111.]

The MIDI & Multimedia Exchange BBS. (415)771-1788. .MOD, .MID, .VOC, .SAM, .AVI, .FLI & Synth Patch's. Sysop: Walter Perko. [Exp. #112.]

The New Dork Sublime BBS. (415)864-DORK, 255-NERD. Subliminal news for new dorks everywhere. NIRVANAnet node 9:900/10. Sysop: Demented Pimiento. [Exp. #112.]

NiteLite Remote BBS. (415)965-8365 (Public Callers); 965-4097 (Members Only). 8-N-1, Internet email, FidoNet 1:143/214, doors, networked games. Sysop: Byron McKay. [Exp. #112.]

The OtherSide BBS. (415)292-5011. 8-N-1, 24 hrs. Four lines, 18 and over only! Alt. lifestyles—Gay/Bi men and women. Sysop: Robb Norris. [Exp. #110.]

OS2 Support BBS. (415)751-7107. 2400/9600/14,400. 3000+ files, Fido, IBM, OS2 Nets, 60 conferences. [Exp. #110.]

Recovery BBS. (415)255-2188. 8-N-1, 300/1200/2400/9600/14,400. Dedicated to 12 Step Recovery programs (AA, NA, Al-Anon, CoDA, SLAA, etc.). Fido 125/9. Sysop: Rich Gorlin. [Exp. #110.]

Salt And Light BBS. (415)368-0790, 252525. 8-N-1, 2400. Bible/God question and answer resource. Questions answered by four ordained ministers. Bible-related study helps, games, and files. Free. Sysop: Lorin Wilson. [Exp. #111.]

San Francisco PC Users Group BBS. (415)621-2609. 8-N-1, 24 hrs., 1200/2400/9600/14,400. Sysop: Richard Couture. [Exp. #111.]

San Francisco Robotics Society Of America BBS. (415)648-6427. 8-N-1. Software and msgs for robot building enthusiasts.

Sysop: Brad Smallridge. [Exp. #110.]

SMUG (Stanford-Palo Alto Mac User Group) BBS. (415)856-0210. BBS on Threshold 2000, uses Telefinder GUI. [Exp. #111.]

Starnet Connections. (415)949-3133. 8-N-1, 24 hrs., 300/1200/2400/9600. Los Altos. Email, USENET, UNIX, and more. Sysop: Richard Mahn. [Exp. #110.]

Uncle D's Directory. (415)364-3001. 8-N-1, 24 hrs., 1200/2400/9600/38,400. Software for deaf & education, msgs, file search, classified ads, offline mail, doorways. No fees. [Exp. #110.]

VA Listings. (415)744-7793. 24 hrs., 300/1200/2400. VA-owned homes for sale. Multiline. Sysop: David Piersall. [Exp. #112.]

VidGame BBS. (415)742-6441. 2400-16,800. 5500 GIFs, music files, online games, Windows, LAN, utils, computer news, 2.2GB. Sysop: George Hassmer. [Exp. #112.]

Walking Thru Syrup. (415)666-3249, 752-3614. A message based board with subs about homebrewing, coffee, and everything else. [Exp. #112.]

Wetware Diversions Public UNIX. (415)826-0397. 8-N-1, 24 hrs., 1200/2400. Full Usenet news, eight lines. Sysop: Eric Swason (editor@wet.UUCP). [Exp. #112.]

Window World BBS. (415)931-0649. 24 hrs. For people who use Windows-type software. Info., shareware, chat. Sysop: Bob Cram. [Exp. #111.]

Wine Taster's. (415)459-1948. 300/1200/2400/9600/14,400. Info on 700 wineries, maps, forum, shareware, 1GB. Instant access. [Exp. #110.]

510

& the Temple of the Screaming Electron. (510)935-5845. A safe haven for visionaries and paranoids. 242MB of unusual text. NIRVANAnet HQ. Multiuser chat lines: two free, two contributor, two local. Sysop: Jeff Hunter. [Exp. #111.]

AbysS BBS. (510)482-5813. 24 hrs., FidoNet,



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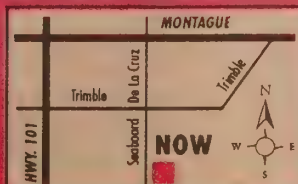
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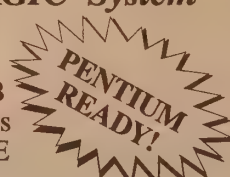
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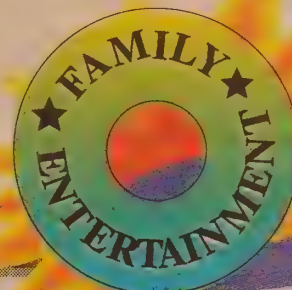
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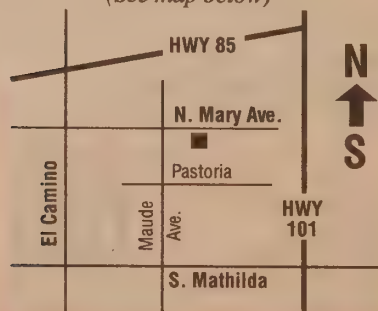
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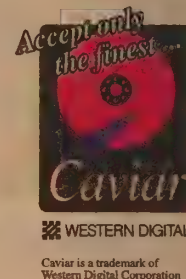
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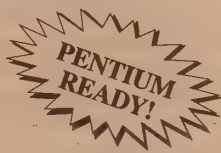
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Microsoft Access Developers Group. Now forming. Downtown San Francisco. Send name, address, and fax # to receive meeting and membership info, to: Computer/Management Solutions, 235 Montgomery St., #750, SF, CA 94104 [Exp. #110.]

ADOBE

Systems Adobe Technology Exchange: San Francisco Peninsula/South Bay Chapter. Meetings: 2nd Wed., 7:00 pm, M&T Publishing, 411 Borel Ave., San Mateo. Call: ATX, (408)562-6104. [Exp. #112.]

AMIGA

3rd Dimension—Imagine/Lightwave User Group. Meetings: 1st & 3rd Mon., 6:30 pm, Computer Showcase, 510 1/2 Fredrick St., SF. Call: Ollie, (415)863-8792. [Exp. #111.]

AAA—Amiga Addicts Anonymous. Meetings: 3rd Tues., Concord Water District Bldg., 1311 Concord Ave. Classes, monthly disks, info line. Call: (510)935-0829. [Exp. #115.]

ACCESS—Amiga & Commodore Computer Enthusiasts Society. Meetings: 2nd Thurs., 7:00 pm, Livermore Airport Terminal. Call: Paul, (510)829-6053. [Exp. #110.]

AUM—Amiga Users Of Marin. Meetings: 3rd Wed., 7:30 pm, College of Marin Science Center, Rm. 191, Kentfield. Desktop Video SIG, Rm. 192, 6:00 pm. Call: (415)479-6717. BBS: (415)485-5895. [Exp. #115.]

AWEST Amiga Users In SF. Meetings: 1st Thurs., 7:00 pm, Laguna Honda School, Conference Rm., 1350 7th Ave., San Francisco. Call: (415)584-8406. BBS: (415)824-8774. [Exp. #115.]

FAUG—First Amiga User Group. Meetings: 1st Tues., 7:30 pm, HT Electronics, 275 N. Matilda Ave., Sunnyvale. Q & A, new product demos, public domain software. Call: Mike Fisher, (415)855-9816; BBS: (415)595-2479; Usenet: miket@hpspd.hp.com. [Exp. #111.]

RE—AMIGA Redwood Empire Amiga User Group. Meetings: 2nd Tues., 7:30 pm, Robert Park Jr. HS, RM. C-5, 7165 Burton Ave., Rohnert Park. Call: (707)523-9978. BBS: (707)795-2717. [Exp. #115.]

APPLE

PAUG—Peninsula Apple User Group. Meetings: 3rd Thurs., 7:00 pm, Ampex Cafeteria, 411 Broadway, Redwood City. All Apples. Beginners, advanced, Q&A, new product demon, PD software. Call: Roger Laker, (415)367-8657. [Exp. #113.]

AT&T

AT&T Computer User Group. Meetings: 1st Wed., general discussion at 6:00 pm, main program at 7:00 pm, 50 Fremont St., 40th Floor, San Francisco. Call: Jim Lansing, (415)885-6631. [Exp. #115.]

AT&T UNIX Computer User Group. Meetings: 3rd Wed., main program begins at 7:00 pm, location varies, South Bay area. Call: Thad Floryan, (415)961-5157. [Exp. #115.]

ATARI

Bay Area Atari Users Group. Meetings: 1st Mon., 7:30 pm, Agnews Aud., 2nd fl., San Jose. Write: c/o 3691 Eastwood Cir., Santa Clara 95054. Call: Joe Fischer, (408)988-3065. [Exp. #114.]

DACE—Diablo Atari Computer Enthusiasts. Meetings: 1st Thurs., Contra Costa Water District Bldg., 1331 Concord Ave., Concord. Call: Dan Galant, (510)689-8256. [Exp. #113.]

STace—Atari Computer Enthusiasts. Meetings: 3rd Thurs., 7:30 pm, AT&T Bldg., 3260 Sebastopol Rd., Santa Rosa. Call: Kim Remick, (707)795-8173. [Exp. #115.]

COMMODORE

ACCESS—Amiga & Commodore Computer Enthusiasts Society. Meetings: 2nd Thurs., 7:00 pm, Livermore Airport Terminal. Call: Paul, (510)829-6053. [Exp. #110.]

C=HUG (Commodore Hayward User Group). Meetings: 2nd Sat., 2:00 pm, Palma Ceia Park. (510)531-3734. [Exp. #112.]

CWEST Commodore 64/128. Meetings: 3rd Mon., 7:00 pm, UC Med Center, Bldg. C, Rm. C-213, 521 Parnassus, San Francisco. Call: (415)626-9946. [Exp. #115.]

CONTACT MANAGEMENT

Bay Area TeleMagic User Group. Meetings: 4th Wed., 4:00 pm, Call: George Workman, (408)476-6385. [Exp. #115.]

CORELDRAW

CorelDraw User Group. Meetings: 3rd Thurs., 6:00 pm, ACAD: Association of Corel Artists and Designers, Northern CA Chapter. Call: Matt O'Malley, 1-800-462-5763. [Exp. #114.]

CP/M

San Francisco Computer Society. Meetings: 4th Mon., 7:00

pm, 7th Ave. Presbyterian Church, 1329 7th Ave., San Francisco. Call: Bob Forsberg, (415)885-6202. [Exp. #113.]

DBASE

Association Of Database Developers, dBASE SIG. Meetings: 4th Tues., 7:30 pm, The Gatehouse, Ft. Mason Center. \$5.00 guest fee, free to ADD members. Call: (415)281-5638. [Exp. #110.]

Association Of Database Developers, Fox SIG. Meetings: 1st Thurs., 7:00 pm, PG&E Tower, 77 Beale St., Rm. 1760. \$5.00 guest fee, free to ADD members. Call: (415)281-5638. [Exp. #110.]

Silicon Valley Access DB Developers Group. Meetings: 2nd Wed., 7:00 pm, Call: Craig Bauer, (408)745-7600. Fax-On-Demand info: (408)745-0740. [Exp. #115.]

DEC

BayVAC. Meetings: approx. monthly. Users of DEC hardware and software. Call: Rich Taylor, (408)776-4978. [Exp. #113.]

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BMUG SIG On Freedom, Privacy, And Technology. Meetings: Last Sun., 2:00 pm, BMUG office, 2055 Center St., Berkeley. Call: Judi Clark, (510)549-2684. [Exp. #110.]

IBM AND COMPATIBLES

Berkeley PC User Group. Meetings: 2nd Mon., 7:00 pm, Winners Circle Systems, 2618 Telegraph Ave., Berkeley. Presentations followed by discussion, PD library, newsletter, Geo Ensemble SIG. No charge. Call: Mel Mann, (510)526-4033. [Exp. #110.]

Delta PC Users Group. Meetings: 3rd Sat., 10:00 am, Pittsburg Adult Ed., Rm. 23, 20 E. 10th St. Call: (510)427-2255, ext. 744. [Exp. #110.]

DVPC—Diablo Valley User Group. Meetings: 1st Thurs., 7:30 pm, Bank of America, Bldg. B, Clayton Rd. at Galindo, Walnut Creek. SIGs include WordPerfect, Windows, Paradox, Beginner's, Visual Basic, education/entertainment, and new users. Call: (510)943-1367. [Exp. #110.]

EastBay FOG. Meetings: 2nd Wed., 7:30 pm, Episcopal Church of St. John-in-Montclair, 1707 Gouldin Rd., Montclair. All microcomputers, MS-DOS, CP/M. Call:

(510)653-2627. [Exp. #112.]

Golden Gate Computer Society. Meetings: 4th Mon., 7:00 pm, San Rafael Community Center, 618 B St., San Rafael. Free intro to computers class at 6:00 pm. Call: (415)927-2909. [Exp. #113.]

PC Clone User Group. Meetings: 2nd Mon., 7:00 pm, Ft. Mason, Rm. C217. Visitors \$3. Call: (510)684-0107. BBS: (415)652-1736 [Exp. #110.]

PC Clubhouse. Meetings: 1st Fri., 7:30 pm, Meiklejohn Hall, CSU Hayward. To share knowledge and PD/shareware software. Club has several BBSes in East Bay and Amador Valley. Call: (510)483-9500, 429-1007. BBS: (510)889-1932 (Hayward). [Exp. #112.]

PC Users Group Of The Redwoods (PCUGR). Meetings: 2nd Thurs., 6:30 pm, Santa Rosa Veterans Memorial Building. Call: (707)527-USER. [Exp. #110.]

Peninsula Computer Club. Meetings: 2nd Thurs., 7:30 pm, Social Room, 222 Laurel St., San Carlos. DOS and CP/M libraries. Call: Larry Welling, (415)593-9981. BBS: (415)571-9259. [Exp. #110.]

San Francisco Business Computers. Meetings: 4th Tues., 5:30 pm. For those who use computers in business. Visitors \$5. Call: Jordan Rosenberg, (415)788-5338. [Exp. #115.]

San Francisco PC Users Group. Meetings: 3rd Tues., 6:15 pm SIGs, 7:30 pm General Meeting. Fort Mason, Bldg. A. Call: (415)979-5879. [Exp. #114.]

Silicon Valley Computer Society—SVCS. Meetings: 2nd Wed., 7:30 pm, Hewlett-Packard, Bldg. 48, Oak Room, 19483 Pruneridge Ave., Cupertino. Call: (408)956-0864. BBS, (408)956-0317. [Exp. #113.]

South Bay WordPerfect User Group. Meetings: Monthly, dates vary. Saratoga Community Library. Free. Call: Martin Van Derpool, (408)238-8434. [Exp. #113.]

Stanford Palo Alto Area User Group. Meetings: Last Wed., 7:30 pm, Varian Aud., 3075 Ilansen Way, Stanford. DOS/Windows. Free. Call: (415)329-8252. [Exp. #115.]

INTERFACE DESIGN

IICS Human Interface SIG. Meetings: Last Tues., Medius IV, 52 Colin P. Kelley Jr. St., Suite 101, San Francisco. Come join us for a rowdy probing of workable and nonworkable interface designs. Call: (415)905-6959. [Exp. #115.]

LAPTOPS

HPX HP Laptops & Handhelds. Meetings: 2nd Sat., Sunnyvale.

Call: Michael Felsenstein, (415)564-8279. [Exp. #111.]

LEGAL

SF Bar Assoc. WordPerfect User Group. Meetings: 3rd Wed., noon, SF Bar Assoc. Boardroom, 7th fl., 685 Market St. Brown bag meetings. Call: (415)421-5650. [Exp. #114.]

MACINTOSH

A32 Macintosh User Group. Meetings: 2nd Sat., 10:00 am, GTE Bldg 3 Cafeteria, 100 Ferguson Dr., Mountain View, corner of Central Expressway and Highway 237. Call: (408)263-0398. [Exp. #115.]

BMUG—Berkeley Macintosh User Group. Meetings: Every Thurs., 6:00 pm, Physical Sciences Lecture Hall, UC Berkeley Campus. Call: (510)549-BMUG. [Exp. #115.]

Diablo Valley Macintosh User Group (DVMUG). Meetings: 3rd Tues., 7:00 pm, Old Republic Title Co., 3000 Clatyon Rd., Concord. Get together w/Mac and Performa users. Enjoyable SIG meetings. Call: (510)945-4548. [Exp. #111.]

International Macintosh User Group (IMUG). Meetings: 3rd Thurs., 6:45 pm, location varies. A forum for multilingual computing. Call: Roger Sherman, (415)859-5146. [Exp. #113.]

Macintosh SIG. Meetings: 3rd Tues., 7:00 pm, Apple Cafeteria, City Center 4, De Anza and Rodriguez, Cupertino. Sponsored by Software Entrepreneurs' Forum. Call: Jeff Cherniss, (408)358-5150. [Exp. #115.]

Macs Of Marin. Meetings: Last Wed., 7:30 pm, Corte Madera Rec Center, 498 Tamalpais Dr., Corte Madera. Marin County Mac User Group for all levels of expertise, beginners welcome, SIGs. [Exp. #112.]

PAUG—Peninsula Apple User Group. Meetings: 3rd Thurs., 7:00 pm, Ampex Cafeteria, 411 Broadway, Redwood City. All Apples. Beginners, advances, Q&A, new product demos, PD software. Call: Roger Laker, (415)367-8657. [Exp. #113.]

SPC Apple User Group. Meetings: 2nd Wed., 7:30 pm, Fremont Main Public Library, 2400 Stevenson Blvd. Call: Dean Fearn, (510)881-9160. [Exp. #112.]

MULTIMEDIA

DesignSIG. Meetings: 3rd Tues., 6:00 pm. New SIG open to independent businesspeople in graphic arts, word processing, and related fields. Focus to share concerns and solutions related to running own business. Call: Bill Brent, (415)282-7368. [Exp. #115.]

International Interactive Com-

munications Society—I Meetings: 2nd Tues., 7:00 alternate locations San Francisco and South Bay. For people involved or interested in developing and using interactive multimedia technologies. IICS Hotline, (415)252-8 [Exp. #113.]

Macromedia User Group. Meetings: 1st Wed., 7:00 pm, 600 Townsend, at 7th St., San Francisco. Authoring, content, and tools. Call: J. Dowdell, (415)665-3 (days); 71165.3065@compuserve.com. [Exp. #112.]

Multimedia SIG. Meetings: Thurs., 7:00 pm. SIG of software Entrepreneurs' Forum. Call: Ralph Gilman, (408) 0551. [Exp. #115.]

NANOTECHNOLOGY

Nanosystems Study Group. Meetings: Alternate Mondays, 7:30 pm, University Lutheran Church, 1611 Stanford Ave., Palo Alto. The study group goes through Eric Drexler's book *Nanosystems: Molecular Machinery, Manufacturing, Computation*. Announcements and mailing list, contact: Kaehler, Ted. Email: Kaehler2@AppleLink.Apple.com. Phone: (408)974-6241. [Exp. #115.]

The Assembler Multitasking. Meetings: every other Monday, 7:30 pm, University Lutheran Church, 1611 Stanford Ave., Palo Alto. An open discussion of new technical developments in Nanotechnology and its consequences and dangers. Nanotechnology. Organized by Ted Kaehler. Email: Kaehler2@AppleLink.Apple.com. Address: 20525 Mariani Ave., MS 301-3D, Cupertino, 95015. [Exp. #115.]

NETWORKING

NetSIG. Meetings: 4th Thurs., 7:00 pm, Novell Sunnyvale Networking SIG for Software Developers. SEF group. Skip Addison, (408)277-5 [Exp. #111.]

NOVELL

Silicon Valley Novell User Group. Meetings: 3rd Wed., 6:30 pm, Sundowner Inn, corner of Ross and Matheson, Sunnyvale. Call: Bill Stroger, (408)739-9081. [Exp. #115.]

OS/2

Monterey Bay And NPGS User Group SIG. Meetings: Thurs., 7:00 pm, Spanagel Naval Postgraduate School, Monterey. Demos and presentations, question and answer sessions, assistance

USER GROUPS

setup. Call: Michael Schievelbein, (408)656-2520 (days). [Exp. #115.]

OS/2 SIG Of San Francisco. Meetings: 2nd Wed., 7:00 pm, location varies. Call: Margery Blum, (415)931-3110. [Exp. #112.]

PARADOX

Bay Area Paradox User Group (bapals). Meetings: 4th Tues. (except June and July, 4th Wed.), 4:30 pm, SF City College, 800 Mission St. Call: (415)995-4688. [Exp. #115.]

SVCS Paradox SIG. Meetings: 3rd Tues., 7:00 pm, Tandem Computers, Bldg. 251, 10100 N. Tantau, Cupertino. Membership: \$12/yr. Call: Scott Jackson, (408)738-0424. [Exp. #114.]

PROGRAMMING LANGUAGES

APL Interest Group Of Northern CA. Meetings: 2nd Mon., 7:00 pm, Syntex Labs, 3401 Hillview Ave., Palo Alto. A member SIG of ACM. Call: (408)742-5277. [Exp. #110.]

Forth Interest Group Of North Bay. Meetings: 2nd Sat., 1:00 pm, 2055 Center St., Berkeley. Tutorial at noon. Call: Leonard Morgenstern, (510)376-5241. [Exp. #113.]

North Bay Forth Interest Group. Meetings: 2nd Sat., 1:00 pm, 2055 Center St., Berkeley. Tutorial at noon. Call: Leonard Morgenstern, (510)376-5241. [Exp. #113.]

Power BASIC Study Group. Meetings: Now forming. Call: Thipdar, (510)783-1972. [Exp. #111.]

Sacramento Forth Interest Group. Meetings: 4th Wed., 7:00 pm, SMUD, 1708 59th St., Rm. A., Sacramento. Call: Bob Nash, (916)487-2044. [Exp. #113.]

San Francisco North Bay Smalltalk/V User Group. Meetings: Every other month in downtown SF. Call: David Freihofner, (415)362-4283. Email: dfrei@well.sf.ca.us. [Exp. #112.]

SEF/SVCS Visual Basic SIG. Meetings: 2nd Thurs., 7:00 pm, Cubberley Comm. Ctr., Rm. H-1, 4000 Middlefield, Palo Alto. Call: Allan Colby, (415)851-4657. [Exp. #114.]

SF Bay Area Visual BASIC User Group. Call: Gustavo Eydelteyn, (510)547-7295. [Exp. #111.]

Silicon Valley FIG. Meetings: 1st Mon. after 1st Sat., 7:00 pm, Membership in the Silicon Valley Chapter of the Forth Interest Group is separate from International FIG. Call: Henry Vinerts, (510)790-3945. [Exp. #115.]

Silicon Valley Forth Interest

Group. Meetings: 4th Sat., 10:00 am, Applied Biosystems, Inc., Conference Room A/B, 230 Lincoln Centre Dr., Foster City. Call: Art Hampton, (415)873-8554. [Exp. #113.]

Visual BASIC SIG. Meetings: 2nd Thurs., 7:00 pm, Cubberley Community Center, 4000 Middlefield Rd., Rm. H-1, Palo Alto. Sponsored by Software Entrepreneurs' Forum. Call: Allan Colby, (415)851-4567. [Exp. #115.]

R:BASE

R:BASE Developers Group. For meetings and membership info, call: (415)956-1200. [Exp. #110.]

SYBASE

Sybase User Group. For information, write: Sybase User Group, attn: Mar-Com, User Group Membership, 6475 Christie Ave., Emeryville, CA 94608. [Exp. #113.]

TELECOMMUNICATIONS

BMUG Telecom SIG. Meetings: Last Wed., 8:00 pm. How to use your modem, terminal programs, and the BMUG BBS. Call: (510)549-BMUG. [Exp. #110.]

TEXAS INSTRUMENTS

TI-99/4A. Meetings: 2nd Sat., Oakland. Call: Fred, (510)530-8335. [Exp. #115.]

UNIX/XENIX

BACUG—Bay Area Coherent User Group. Meetings: 3rd Sun., 2:00 pm, San Mateo. Call: Viki Tamaradze, (510)549-1876; email: johnp@dumbcat.sf.ca.us. [Exp. #113.]

N. California UNIX SIG. Meetings: New group, just forming. UNIX, XENIX, LINUX, Coherent. Call: Randy Just, (707)769-1648. [Exp. #112.]

UNIX SIG. Meetings: 2nd Tues., DEC, 800 W. El Camino Real, Mountain View. Sponsored by Software Entrepreneurs' Forum. Call: Priscilla Rowe, (415)776-0513. [Exp. #110.]

UNIX/Xenix SVUG. Meetings: 3rd Wed. 7:00 pm, Call: (408)745-7600. Fax-On-Demand info: (408)745-0740. [Exp. #115.]

VIDEO TOASTER

Video Toaster User Group. Meetings: Last Thurs., 7:30 pm, HT Electronics, 275 N. Mathilda Ave., Sunnyvale. Special guests, equipment

demos, hands-on workshops, plus info/tips on new System 3.0. Call: Andrew Timmins, (408)243-9233 (eve). [Exp. #115.]

VIRTUAL REALITY

Silicon Valley Virtual Reality. Meetings: 2nd Thur., 7:00 pm, Call: (408)745-7600. Fax-On-Demand info: (408)745-0740. [Exp. #115.]

Virtual Reality Group. Meetings: varies. VRG is a nonprofit organization dedicated to supporting and promoting the development of VR technologies in the Bay Area. Everyone welcome. Call: Linda Jacobson, (415)826-4716. Email contacts: Linda Jacobson (lindaj@well.sf.ca.us), Peter Rothman (avatarep@well.sf.ca.us), or

Timothy Childs (tchilds@well.sf.ca.us). [Exp. #114.]

Virtual Reality SIG. Meetings: San Francisco, East Bay. Call: Mike Conduris, (415)566-8681. [Exp. #110.]

WINDOWS

BMUG Windows Programmers SIG. Meetings: 1st Tues., 6:30 pm, 2055 Center St., Berkeley. The Programmers SIG is a forum for Windows programmers of all levels to meet and exchange information. Call: Ferdinand Rios, (510)526-3031. [Exp. #115.]

WinSIG. Meetings: 1st Wed., 6:30 pm, Cubberley Community Center, Rm. H-1, 4000 Middlefield Rd., Palo Alto. Windows SIG of the Software Entrepreneurs' Forum. Call: Fran Finnegan, (415)288-4400. [Exp. #115.]

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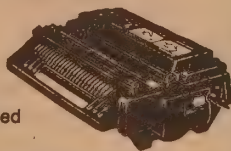
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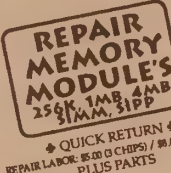
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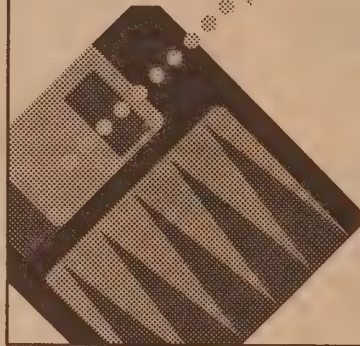
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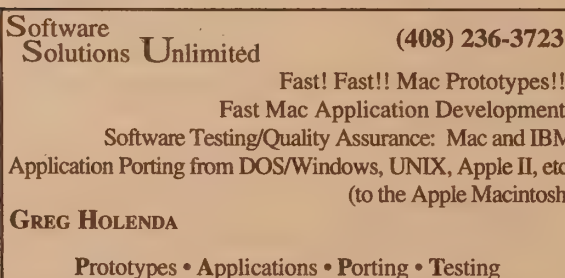
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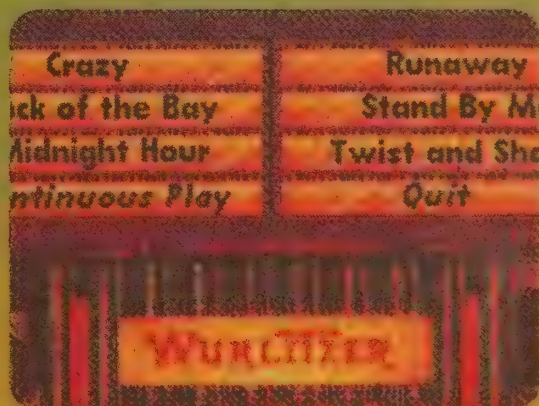
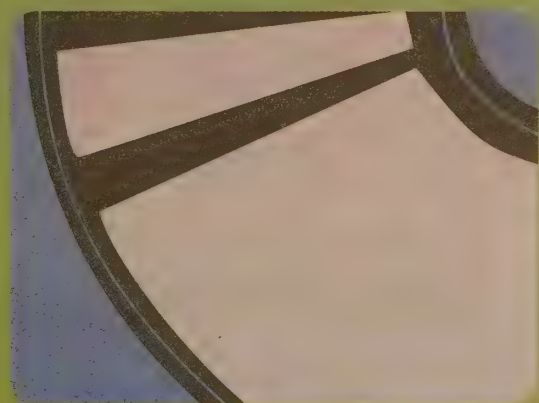
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WALTZER

BY JONATHAN E.

Copyright © 1993 by Jonathan E. All rights reserved. Jonathan E. has worked with desktop multimedia since 1988. He also writes about world music and the Archaic Revival for BAM. His USPS mailing address is c/o SoundSwell, 54 29th St., Richmond, CA 94804. His email address is jeve@well.sf.ca.us

So You Want To Be A Rock And Roll Star is a CD-ROM from Interactive Records, self-described as "the first software record company." It's designed to teach the user how to play the guitar or keyboard parts to six classic songs, and can also be used as a karaoke machine if you wish to sing along to the instrumental backing. The CD-ROM's

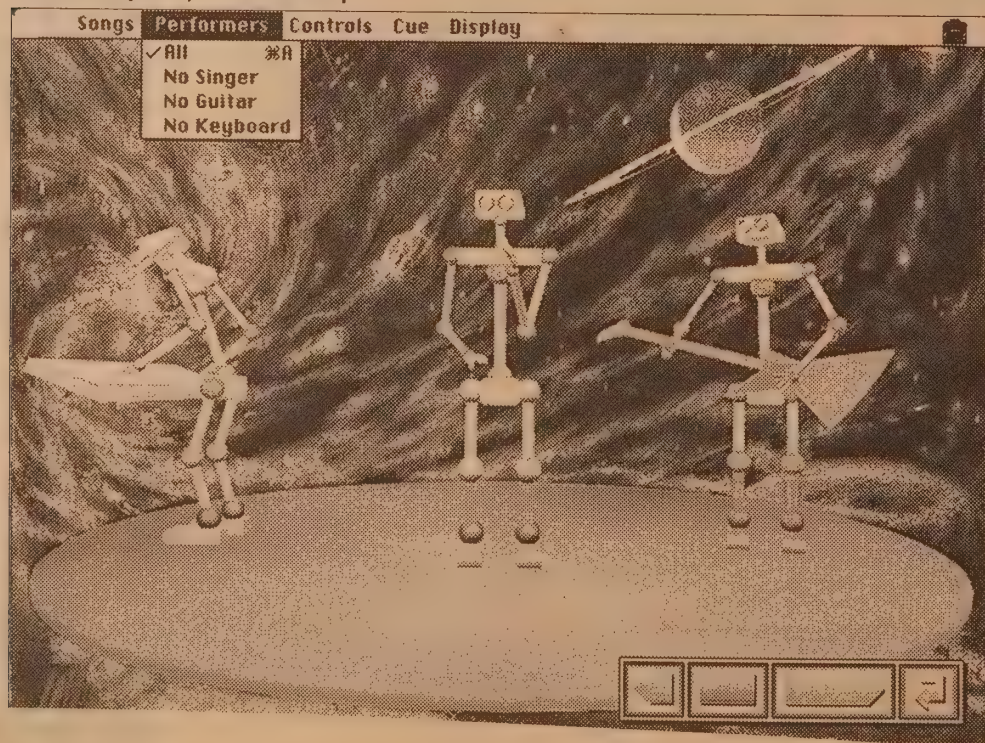
strengths provide insight into the advantages interactive multimedia offers for learning and entertainment in the future, while the weaknesses of v1.1, which are mostly due to the evolving technology rather than content, illustrate many of the tricky issues multimedia developers have faced in the recent past—and may continue to face.

Multimedia & beyond

So You Want To Be A Rock And Roll Star has a Macromind Director front end, controlling CD Red Book audio, QuickTime movies, and AIFF audio files. The use of Red Book audio means that you must load the data files onto your hard disk, since the CD-ROM drive cannot access both data and Red Book audio simultaneously. This also overcomes the usual problem of CD-ROM not being speedy-ROM (however, see Tony Reveaux's "Graphic Adventure Developers On The Edge" in our last issue for insight into how game developers are dealing with improving the access speeds of CD-ROMs), but the drawback is that you must have 4MB of free space on your hard disk. The big advantage is that you get full CD-quality audio for the songs.

Once you've loaded the CD-ROM into your drive, you drag the *Rock And Roll* jukebox icon onto your desktop and double click on it to open it. Then you wait—and wait some more, about a minute and a half, while the main jukebox loads. Once it's loaded, you're rewarded with a magnificent animated jukebox, complete with little bubbles in its colorful tubes. A cover version of Chuck Berry's "Rock And Roll Music" anthem loops continuously until you select one of the six songs. The choices are "In The Midnight Hour," "Twist And Shout," "Runaway," "Dock of the Bay," "Stand By Me," or "Crazy." These songs were used because, with the exception of "Crazy," they are somewhat transgenerational, charting in the 60s and also in the 80s.

You can isolate individual players and instrument parts for closer study.



When you make your selection, you wait again while your selection is loaded. This time, however, the wait time is camouflaged by a trivia question about the history of rock and roll, one of one thousand that are programmed in sequence so that you don't get the same one twice until you've been through the whole loop. As the load finishes, the answer appears on screen. This neat little trick goes some way towards reducing the irritation factor of the long loads and is used every time a different song is loaded. These long loads will be reduced to about thirty seconds through better algorithms in the new v1.2 of the CD-ROM. They are also shorter with a more powerful CPU (this was running on a Mac cx). Future improvements in both CD-ROM drive and CPU hardware will also lessen these load times.

However, this opportunity is also a difficulty that title developers have to deal with. These improvements in technology mean that your title is never really finished. Every time something new and better comes along, the title must be reprogrammed to take advantage of the improvements. Old inventory may become either unusable on a new drive, or so embarrassingly slow as to be unsaleable.

This happened to Interactive Records with the introduction of Apple's new dual-speed drives. A code conflict between the software driver for the new drive and

Director made it necessary for Macromedia to rewrite some of Director's code. In the lag time between the new drives, the new code, and reprogramming and remastering the CD-ROM, Interactive felt that it could not ship v1.1 of the product.

The lesson for developers is to keep

Improvements in technology mean that your title is never really finished. Every time something new and better comes along, the title must be reprogrammed to take advantage of the improvements.

inventory low and to pay very close attention to what's going on in other parts of the industry, while praying that everybody's schedules are well synchronized.

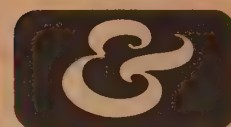
When the new song is loaded, a graphic and a simple control panel appear on the screen. Clicking the Play button on the panel causes the song to start playing. The songs are cover versions, specially recorded for *So You Want To Be A Rock And Roll Star*. The sound is very good over decent outboard speakers, and the vocalists are not far off from the original hit versions—they were hired with a classified ad in the back of *BAM* asking for applicants who could sing like Otis Redding or Wilson Pickett, although as Steven Rappaport, President of Interactive Records, freely admits "who could sound like those guys?"

THE LEARNING JUKEBOX

However, the point of this CD-ROM is not to be simply a collection of cover versions. The point is to be able to interact with these songs and learn more about them than you ever could with a straight cover recorded and distributed with conventional techniques.

As the song plays, the graphic goes through a simple animation. The style is quite different for each song, and each is a long way from what you're used to seeing as music videos on MTV. "Runaway" has a particular charm. It uses Steven Rappaport's high-school yearbook as its basis, with additional contemporary pictures serving to link the decades. "Twist And Shout" has an amusing performance by robot musicians. "Crazy" uses a wistfully drawn bar-room drinking scene and "Dock Of The Bay" has a delicate poignancy. "In The Midnight Hour," on the other

Multimedia beyond



hand, is rather ugly. One of the impressive features here is that the animations are synched with the Red Book audio, whatever the CPU speed of the Macintosh you are using. Of course, this essential feature is also one that may need to be reprogrammed whenever a new Macintosh model enters the market.

Both the menu bar and the control panel disappear while the song is playing, which lessens their distraction from the graphics, but also leaves the first-time user wondering how, if at all, to control the action. In fact, a mouse-click will stop the song, although it must be a rather slow and deliberate click. The rapid click that most experienced users are used to is not registered, which again leads to wondering what control you have. Once the song is stopped, the menu bar and control panel reappear.

Besides being able to play the song straight through, load another song, or return to the jukebox, the menu bar allows you several options. Under the Performers menu, you can choose to hear the song without the guitar, the keyboards, or the vocals. When one of these performers (and you can only remove one at a time) is removed, the graphic is animated, with that performer absent. The Controls menu, which duplicates the screen control panel, also allows you to loop either the entire song or the specific part of the song selected from the Cue menu—the chorus, the bridge or the first, second or third verses

depending on the structure of the song.

The Display menu leads to the real heart of *So You Want To Be A Rock And Roll Star*. Under it, you can change the screen display from the default Animation to Sheet Music, Analysis, Guitar or Keyboard Lessons, or Show Lyrics. These display options are interlinked with the Performers and Cue menus, while the Show Lyrics option toggles on and off in the Animation display; thus, if the cue is set to the second verse of the

Animation with No Guitar selected and Show Lyrics on, the song will start at that point, displaying the correct lyrics, a phrase at a time and without the guitar. The Sheet Music display is exactly as you would expect, offering an advantage over standard printed sheet music in that it highlights the measure of the song that is currently playing—once again the graphics are synched with the sound whatever model Macintosh you are using. The Analysis display shows all the measures in a row with each chord color-coded, and again the measure playing is highlighted in sync. A picture of any

chord can be shown to help the user learn music theory about the interval comprising the chord.

Selecting the Guitar Lesson or Keyboard Lesson causes the screen to display still photos of the player's finger positions from the point of view of the player. These photos change along with the chords, or can be controlled one frame

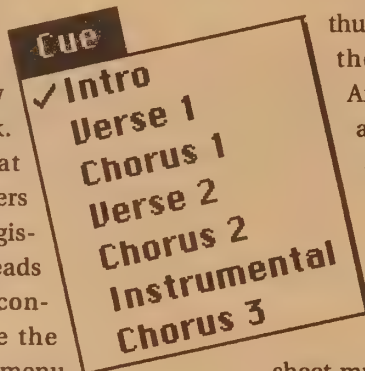
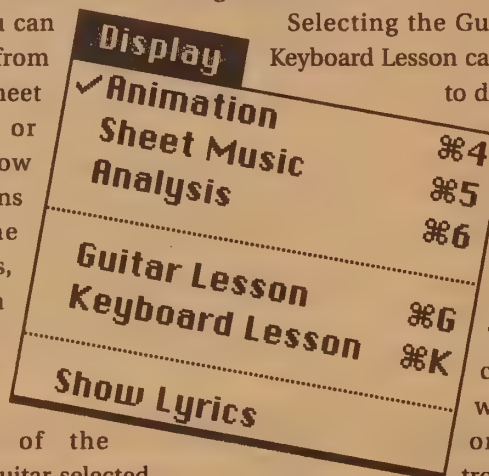
at a time at the user's pace. In addition, there is a QuickTime movie with each photo, explaining how the chord is fingered, possible alternatives, and other helpful hints. With these features *So You Want To Be A Rock And Roll Star* leaps to a level of interactivity and user-determined pacing that leaves instructional books or videos far behind.

In the Analysis section, there are two other QuickTime movie windows available, Theory and History. In Theory, Dennis Criteser of the Blue Bear School of Music explains the musical theory behind the chord progressions of the song. Taken

together, the six songs form an introductory course in theory, and the user is advised to study them in progression from the easiest to the most difficult. The Theory lessons can also be printed out, as can the Help section for the whole CD-ROM, the Help for a particular section, or the History or Jargon for each song.

History features Steven Rappaport talking about the different

versions of the song, its writer, and other historical tidbits with shots of old record labels, charts, publicity photos, and so on. Personally, this is the part of the CD-ROM that I like the best—not only because its content is the most interesting to me as a record collector rather than an aspiring musician—but also because it is where Rappaport's passion for "old rock'n'roll" as a fan takes over from the need to teach playing technique in a relatively straight-



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Multimedia & beyond

forward fashion.

There is only one major drawback—the lack of excerpts from those old records to give a taste of their flavor. Rappaport had originally planned to use such excerpts but, as the music industry slowly became aware of multimedia and the goldmine it might become, licensing fees skyrocketed

and the threat of legal action loomed. It would seem as though short excerpts should be able to be used under the “fair use” provisions of the copyright law; however, that’s a gray area of the law and a small company like Interactive Records simply cannot afford to test it.

Selecting any display option other than

Animation also brings up two more menu choices: Jargon and Phrases. Under Jargon, there is a context-sensitive list of musical terms, i.e. only those that you’ll need in the current lesson are displayed. Selecting a term causes a box with an explanation to pop-up. Clicking on any word in bold-face causes an AIFF sound file to play back a musical example of the word or concept being defined. There’s a slightly annoying problem here as there’s a scratchy popping noise at the beginning of each file. Under the Phrases menu, the phrases of the song are displayed and can be individually selected for an audio

The point of this CD-ROM is not to be simply a collection of cover versions. The point is to be able to interact with these songs and learn more about them than you ever could with a straight cover recorded and distributed with conventional techniques.

explanation while the selected phrase is highlighted on the screen so that it is easy to see where it occurs.

So You Want To Be A Rock And Roll Star is designed for people who’ve had three to six months piano lessons, or who may have played a little guitar when younger. However, its approach is so clear and the tone so helpful and encouraging that an absolute beginner should be able to use it to learn these particular songs and a fair amount of musical theory. Its home-brew quality, combined with its content expertise and interactive multimedia techniques, allow Steven Rappaport’s enthusiasm for rock ‘n’ roll and teaching music to shine through. *So You Want To Be A Rock And Roll Star* is an excellent example of what a CD-ROM can be.

So You Want To Be A Rock And Roll Star will run on any color Mac with a CD-ROM drive using System 6.0.7 or later. External speakers or headphones are needed for the CD audio. The recommended retail price for v1.2 is \$79.95. You may order it through your local computer store or Educorp or direct from Interactive Records, 921 Church St., San Francisco, CA 94114. A Windows version will be available this month. ■

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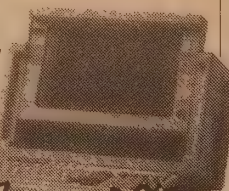
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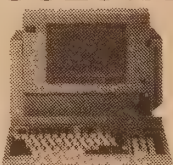


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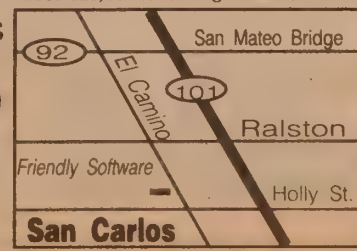
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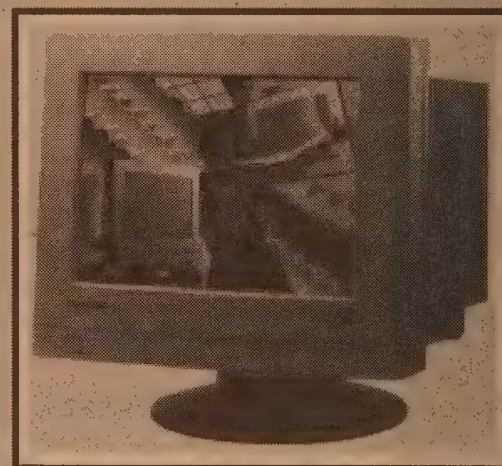
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Amiga Multimedia Tools

The Right Software For Various Jobs

BY DOUGLAS J. NAKAKIHARA

Multimedia involves the combination of graphics and sound into a single integrated presentation. The computer is the common denominator that ties everything together.

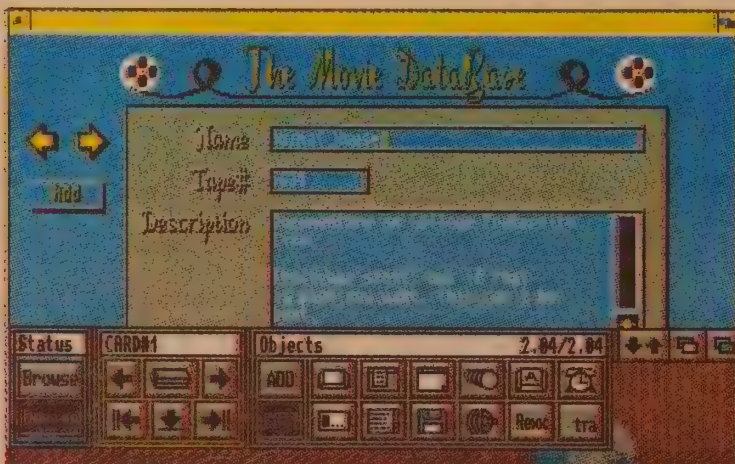
The simplest example of multimedia would be a computer graphics slideshow presented with some sort of background

music. Of course, multimedia can go far beyond this. Graphics can be animated, and can come from external sources like laserdiscs, videotape, and video cameras. Similarly, audio does not have to be generated by the computer. The same external graphics sources often generate audio too. Audio can also come from MIDI instruments and audio CDs.

For two reasons, the Amiga is really unmatched in multimedia potential: its

pre-emptive multitasking operating system, and its ability to display a full-screen animation at an acceptable frame rate. Multitasking provides a means to access functions that may not be featured in the presentation software being utilized—for

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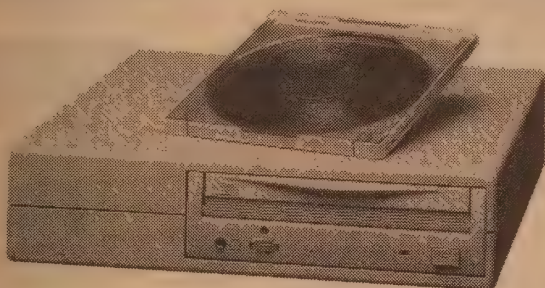


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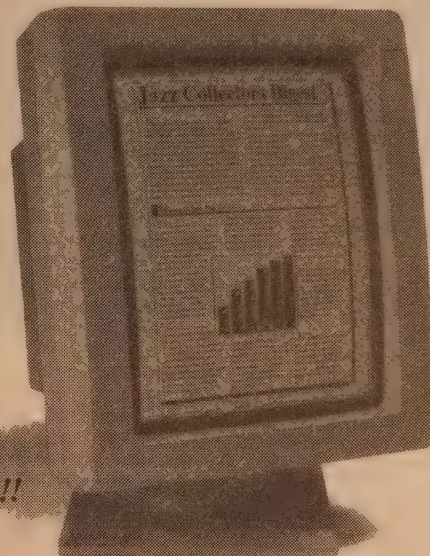
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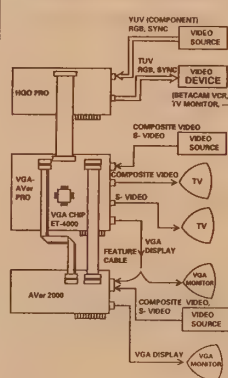
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The PRO 2000 is a New Media Graphics compatible overlay and capture board. It enables up to 3 video sources to be connected to a VGA system, and to display the live video image in full screen or in a scalable window. VGA resolutions up to 800x600 in 16-bit color mode. The audio volume, bass and balance control are software controllable.



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Multimedia beyond



example, if a package doesn't support a particular music format, you can normally multitask a utility program to play the music. With respect to animation, other platforms generally offer quarter-screen or smaller graphics, but the option of full-screen playback makes the Amiga more versatile.

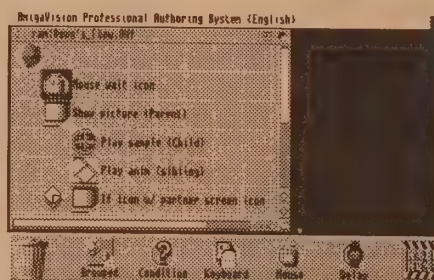
Many multimedia software products are available for the Amiga. Which one is best depends on the type of multimedia presentation you're trying to create. Here's a brief look at some of those products.

AMIGA VISION PROFESSIONAL

Commodore's AmigaVision Professional (AV Pro) represents one of the easiest and most powerful ways to link images, animations, sounds, text, laserdisc players, etc. into a single interactive (or non-interactive) presentation. AV Pro provides various built-in tools for integrating the images and sounds; through the use of ARexx, you can control peripherals not supported in native mode.

All the tools are implemented in the form of icons, which are placed in a "flow window" and collectively referred to as a "flow." This is very similar to a traditional programming

flow chart, as icons are generally executed sequentially from top to bottom.



Although keyboard input is supported, nearly everything can be accomplished using the mouse. Icons are dragged from an icon toolbox onto a flow window and most icon parameters are also set using the mouse. Even numerical settings can be input using a graphical 10-key pad. Commands and special phrases can be inserted using scrolling lists. Icons already placed in a window can be copied or moved within the same flow or to a different window.

AV Pro's object editor provides an easy yet powerful way to set "hot spots," which cause something to happen when clicked on. Generally hot spots are mapped over an image that contains buttons or other obvious click-on areas. Selecting one of the spots returns a user-defined result which can be interpreted by a series of IF-THEN icons and branched off to other parts of the flow. Hot spots can also be animated, and even made to follow a path around the screen. Sound samples can be triggered if a hot spot is selected.

AV Pro offers a multitude of screen transitions, which provide an impressive way to change from one image to another. There are two types of transitions: bit-mapped and windowed. Bit-mapped transitions generally work at the pixel level, while window transitions utilize the entire image. However, differences in

RESOURCES:

AmigaVision Professional, \$399
Commodore Business Machines
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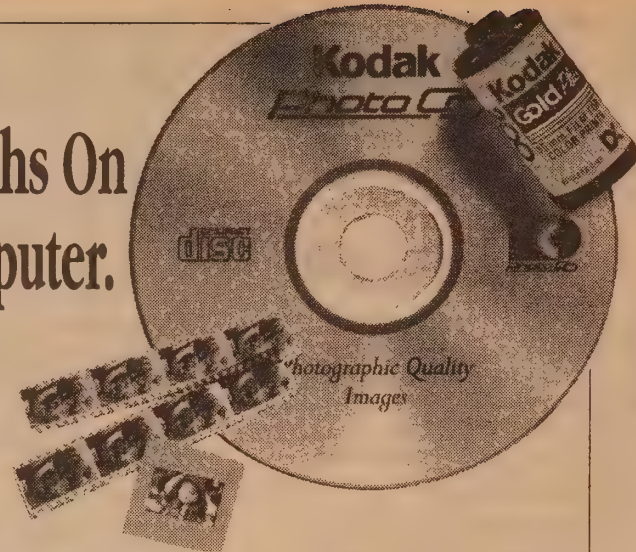


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Multimedia & beyond

color palettes and resolutions will limit their availability or effectiveness.

AV Pro also features frame-accurate control of videodisc players and control of CD players. Excerpts from videodiscs and CDs can be seamlessly integrated into your production. The software supports various brands of disc players. Using AREXX, you can even utilize GVP's IV24 picture-in-picture abilities.

Besides merely triggering IFF samples, AV Pro can also play SMUS or MIDI files. These can be sent to a MIDI device, the Amiga internal sound channels, or both.

Since AV Pro was written in particular for creating CDTV software, there are many memory saving features like CDXL support and streamed animations and sound, which play from disk instead of entirely from RAM. Fonts can be loaded as needed. There is even a feature that allows you to set the memory configuration of your target machine, so you can tell if your flow will run properly on it. (Beware: this feature is not as accurate as you might like it to be.)

A stand-alone freely-distributable player program, missing in earlier versions, is also featured. Although AV Pro could be used for adding audio to Amiga animations, it is best suited for slide show-like presentations or interactive productions.

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CANDO 2.0

CanDo 2.0 is more of a programming tool than a multimedia presentation maker like AV Pro, but it has all of the necessary tools to integrate graphics and audio, and far surpasses AV Pro's button-pushing interactive features. Its only major short coming with respect to multimedia is an absence of built-in screen transitions.

As any programmer will attest, one of the most difficult aspects of programming is creating an intuitive and consistent interface. CanDo, which is similar in some respects to the Dialog Editor included with Microsoft Excel, makes this extremely easy by letting you set up screens, input fields, menus, etc. using the mouse. Combine all of this with a rich programming script language and you've got an awesome programming tool.

With CanDo, your application, called a "deck," can have the look and feel of commercial quality software. Standard Amiga menus with keyboard shortcuts, appicons, as well as hot spots (i.e., buttons) are supported. Besides handling input from the keyboard and mouse, CanDo also supports joysticks and the CDTV controller. A CanDo deck can be compiled into a stand-alone application or smaller versions, requiring a player or CanDo library, all distributable without license fees.

CanDo allows you to handle many chores that would otherwise require extensive coding and programming knowledge in a much simpler fashion. For example, one group of commands allows you to create, examine, and modify icons without knowing the file structure of an icon. You can even incorporate a

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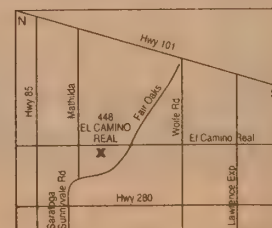
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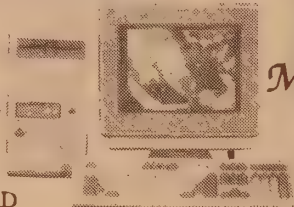
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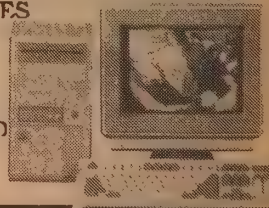
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Multimedia beyond



simple paint program into your application. If you need database handling, CanDo handles this expertly. Powerful control over the parallel and serial ports is also featured; your application can even have its own ARexx port!

If your multimedia project requires extensive interactivity, CanDo may be the ticket. It is important to note, however, that although CanDo makes it fairly easy to set up an interface, making an application functional still requires a little bit of programming savvy in order to write the scripts.

Multimedia aside, if you've always wanted to write programs for the Amiga, but just couldn't learn C, CanDo is the answer to your prayers!

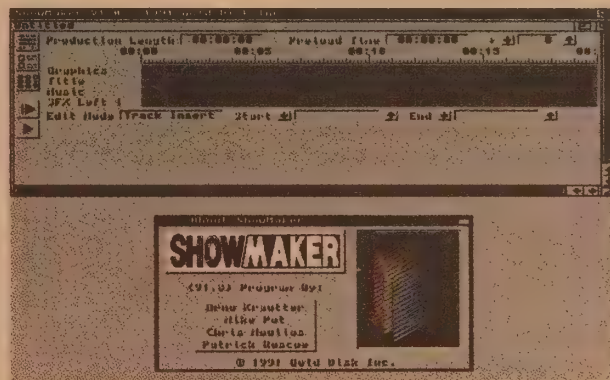
them with real-time titling and transition effects. Showmaker can also control external VCRs and videodiscs, and can automate Digital Creation's SuperGen 2000 wipes and NewTek's Video Toaster effects. It also supports ARexx.

I would consider Showmaker a multimedia sequencing program; you won't want to use it for an interactive presentation, since it lacks interactive features like hot spots.

Using a time-line approach, Showmaker provides a much more precise method for setting up a presentation than CanDo or AV Pro. Time moves in a linear fashion from left to right. Different types of events are listed from top to bottom. These events include graphics, titling, music, sound effects, MIDI commands, and volume controls. For example, if you want to show a picture for three seconds, you drag the

mouse on the graphics line and highlight an area equal to three seconds. A requestor pops up where you designate the picture's filename.

Thirty-six different screen transitions are available; however, in contrast to AV



Pro, transitions cannot occur directly from one graphic to another. Each graphic always fades to black first, before the transition is executed. This eliminates any possible problems caused by graphics with differing color palettes, but somewhat limits the effect.

SHOWMAKER

Showmaker from Gold Disk lets you integrate and control graphics, animation, sound, and music files, and synchronize



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Multimedia & beyond

You can set the desired frame rate for animations—if your Amiga can't handle this rate, the animation will just play slower. As a result, you'll have to tweak the animation or lengthen its time slot to make it work.

A very nice feature is Showmaker's built-in titling, which permits not only still text over still images, but moving titling over animations. One glaring problem occurs if the animation does not use the same color palette for every frame—the titling will change color as the frames change. Notwithstanding this malady, titling is done in real time and is quite impressive. You can use seventeen different motion patterns, which include titling that crawls across the screen as well as the standard scrolling-credits type. The text can be automatically set to outlined, shadowed, or extruded. There is no text import function; all of the text must be typed into the titling requestor. Only Amiga bit-mapped fonts are supported, but there are plenty of good video-quality ones available.

Showmaker automatically calculates preloading requirements to help ensure that the production plays as smoothly as possible. It tries to load as much as it can into RAM to achieve this. Audio support includes the ability to play MIDI or Simple Musical Score (SMUS) files, as well as straight samples. The SMUS files utilize the Amiga internal sound channels, and samples can be directed to any of the four sound channels.

HYPERBOOK

Hyperbook, also from Gold Disk, is a quick and easy way to create interactive multimedia presentations. In some respects it is similar to CanDo, although its abilities are significantly more limited. However, Hyperbook is much easier to learn—almost simple!—and depending on your goals, it may be all you need.

With Hyperbook you build a presentation a page at a time. A page's resolution and number of colors are selectable; how-

ever, there's a maximum number of sixteen colors per page, even in low resolution. Pictures can be used as backdrops, with the 16-color limitation still imposed. Many page transitions are available.

Each page can contain one or more objects, which can appear as buttons, graphics, text, etc. Hyperbook features basic drawing tools for creating objects, or you can import IFF graphics. An object's background, border, and shadow can be set to a particular color or made transparent. Imported graphics will be remapped and sized to the page's resolution and colors.

As you might expect, objects can cause an action to take place when double-clicked. Actions include jumping to another page, showing pictures, displaying text, and making other hidden objects visible.

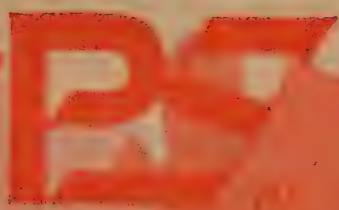
The text display screen includes all of the necessary text navigation tools. Pictures displayed from an object action are not limited to sixteen colors; any ECS IFF graphic can be displayed. ARexx commands or macros, as well as DOS commands, can also be executed.

Animations and audio are not directly supported by the software; however, these are easily incorporated using ARexx or DOS calls. Of course, if the object is just a title or some other non-action aspect to the page, you can set it to a "no action" state. Irregularly shaped hot spots are supported using graphics. Only the areas in the graphic that are not color 0 are "hot," making the shape and not the background hot.

SUMMARY

Combining ease and features, AmigaVision Professional is a solid choice for interactive presentations. For the ultimate in power and versatility, CanDo is tops. If you need non-interactive precision, you might want to consider Showmaker. Hyperbook fits the bill if you are creating simple interactive applications.

Next month we'll take a look at a few more packages, including the recently released Helm from Eagle Tree Software. ■



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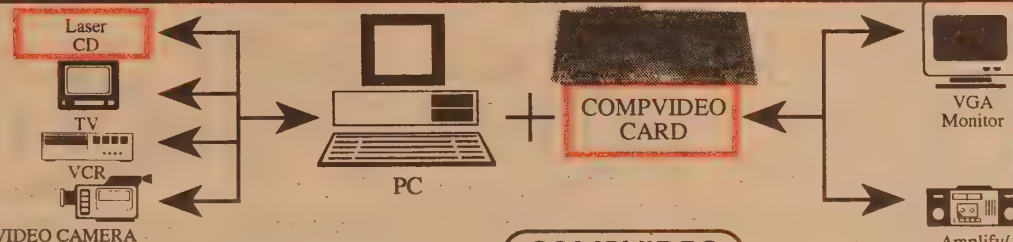
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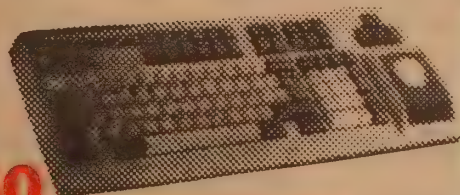
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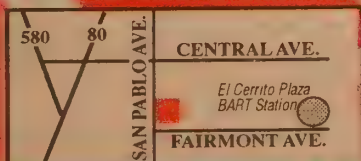
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3D VR From Sun

Workstation Leader Delivers Interface For Practical Applications

BY TONY REVEAUX

Wild Palms, Oliver Stone's high-tech, high-gloss, high-tension miniseries on ABC, delivers a near future (only fourteen years from now), in which holographic virtual reality (VR) becomes a network television broadcast medium. In your home, in your face, and in your mind, VR is no longer a buzz word—it's The Buzz.

With the recent announcement of the FCC's digital standard for high-definition television, the pathway has been marked for multimedia and VR to join the traffic on the airwaves. Let's just hope that broadcast VR doesn't become the Stone's Orwellian manipulative cybertool.

SUN'S VIRTUAL PORTAL

There are at least six levels of VR, ranging

from "desktop window" VR, where you watch a 3D modeling program like Virtus Walkthrough on the 2D plane of your monitor, to fully immersive VR with peripherals like helmets, tracking booms and gloves, that can completely surround your senses with another virtual worldview.

I experienced a version of immersion with Sun Microsystems' Virtual Portal, an environmental installation developed by computer scientist Michael Deering and physicist Howard Davidson. First unveiled at SIGGRAPH, the Virtual Portal now resides behind a pair of massive Star Trek-strength powered doors in an engineering building at Sun's sprawling campus in Mountain View.

The Virtual Portal is a single-viewer system. You stand within a pulpit rail, where a technician measures your eye separation dimension and punches that information into a keyboard, before handing you the pair of StereoGraphics glasses to put on. Three rear-projection screens surround the pulpit, almost within

MultiMedia & beyond

arm's reach. The demo program is a silent color 3D chunky-polygon-based pictorialism familiar to most of you, but here rendered at a resolution of 2048 x 960 pixels. Not only were there objects in 3D, they moved in space like fish in an aquarium.

There were fish—big ones—and I was in the middle of the aquarium. There were also seagulls, which (so it seemed) zoomed over my shoulder; working cuckoo clocks; hovering machine parts; a fully rendered room; and giant arrows that tried to skewer me. A talking head floated around mimicking my head's motions.

If I moved into one of the objects, it would envelop my vision. But no, there weren't any icky fish-insides to see—just color solids, as if they were made of cotton candy or styrofoam and you looked at a slice. This system is advanced, but it was never intended to emulate photorealistic naturalism as in *Wild Palms*. What it does do is provide a platform that can deliver uncannily accurate interactive 3D spatial maps for applications such as science, architecture, design and simulation.

Behind each rear-projection screen is a Sony stereo video projector controlled by a Sun SPARCstation 2GT workstation, all synchronized together. You wear a pair of StereoGraphics Crystal/Eyes 3D Eyewear and the motion tracking is controlled by a Logitech 3D mouse system modified for the environment. The second most amazing thing is that this same SunVR system can now be configured from off-the-shelf components for a one-monitor desktop workstation.

DEEP SPACE 2GT

As seen at the SunWorld exposition in San Francisco and at Meckler's Virtual Reality Conference in San Jose last month, VR has taken on a more practical and positive advance with an increasing number of real products becoming available for development and applications. One benefit VR technology offers the analytical, problem-solving arena is the ability to manipulate 3D objects interactively on the desktop. You can be up to your elbows in virtual space while your feet are still solidly on the ground.

Sun Microsystems' SunVR system is now delivering a complete, turnkey Sun Virtual Holographic Workstation with the Hitachi stereo monitor, StereoGraphics glasses and Logitech mouse and transmitter, based on

a SPARCstation 2GT for \$46,000. With the range of configuration models available for the higher-performance SPARCstation 10GT, it could rise as high as \$80,000. The four models of the 10GT, with the new superscalar SuperSPARC chip, range from the 36 MHz Model 30 at 86.1 MIPS to the 45 MHz Model 45 at 400+ MIPS. But most of the development and demonstrations for the SunVR system have been supported by the workhorse SPARCstation 2GT. These prices will eventually come down, according to Sun.

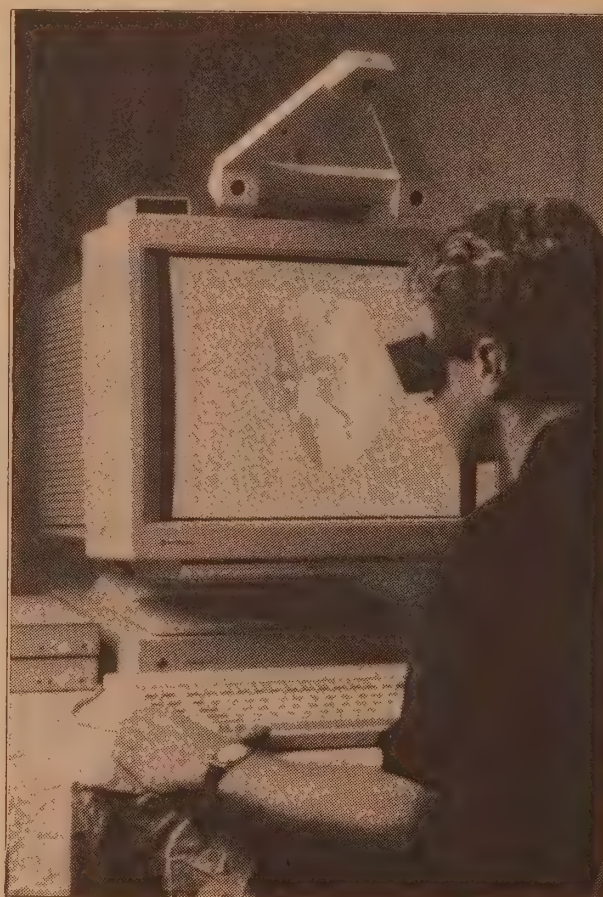
I tried out the Sun Virtual Holographic Workstation, wearing the same glasses as in the Portal, but with an added edge contributed by the Logitech "flying" mouse. Using it like a wand, I could move and manipulate objects. With this system, the 3D graphics seem to poke right out of the screen and past the frame of the monitor. Not only that, but you can whip them around in the "z" axis, stretching them toward or away from you. With the mouse controlling an extrusion tool, I could even create a rod about five feet long by reaching over my shoulder, then returning the extended object in front of my nose. In one of the more dramatic segments of the demo, a spinning cylinder in front of me could be cut like an object on a lathe, with the mouse as the edge, each action creating the appropriate shower of sparks. The clincher is that the system is capable of being used to output the data to a factory floor, where an automated milling machine would duplicate your artistry.

THE FIRE BEHIND THE SPARCS

After seeing many valiant attempts by MS-DOS platforms to support VR, and the increments of hard-won success their developers are achieving, it's still clear that, like high-end computer graphics in general, full VR is still workstation country. I asked Will Shelton, Senior Programs Manager for Advanced Desktop Graphics and Multimedia at Sun, to give us more background on SunVR.

"Sun's Virtual Portal application and implementation is a totally immersive VR

for certain types of training applications where they need that depth of environment," he says. "The workstation setup is used in applications where they don't need immersion, such as in the design automation arena. We actually see



"The Sun Virtual Holographic Workstation delivers realtime 3D based upon a Sun SPARCstation GT with Crystal/Eyes VR stereo glasses from StereoGraphics and a 3D Mouse from Logitech."

more people using workstation setups than Portal installations. It is applying the technology in a different way, where you are mapping computer generated images onto a world environment.

"We're using basically the same technology and hardware for both the Portal and on the desktop. We're just applying it to a different configuration for a different application. When you see the three screens of the Portal being run by SPARCstation 2GTs, we're actually using the projector as the monitor. You are still outputting the stereo images from the workstation. The only thing that you are doing differently is that you're actually coordinating and synchronizing the images across the screens. There is communication going on in the Portal that you don't have on a normal workstation. You could set up, as a display device, three workstations all in a row, or arranged in a 'U' formation with your head in the center,

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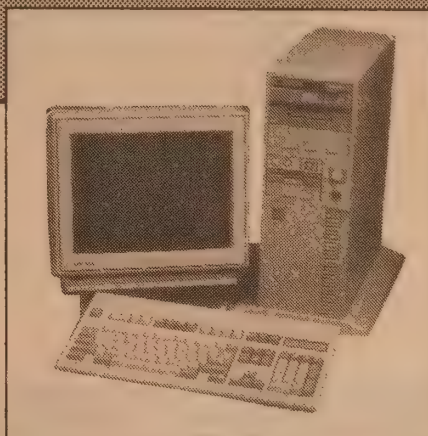
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and have them synchronizing as well. The Portal uses the same software as on the workstations. What we are doing is making it a standard feature of our product line. We're going to be applying the same stereo-ready capabilities to future products as with the GT technology."

STEREO STEROIDS

How does the Hitachi stereo monitor work? "The actual frame buffer in the GT is actually outputting the stereo image," says Shelton. "The monitor is displaying the stereo image, but the actual frame buffer in the SPARCstation GT is generating it. The actual double buffering is done by the graphics frame buffer itself. If you look at the graphics frame buffer as a processor doing the graphics then you can think of that as a kind of dual processing. The double buffering capability is built into the graphics hardware itself rather than using the main CPU, which is one of the

advantages of using a workstation-level computer." (Double buffering is rendering one image in the background while it is displaying the current image, swapping back and forth between one buffer and the other, and generating it at a high rate, so that you can see the sequences as smooth, continuous flow of fluid animation.)

"We have the Hitachi monitor," said Shelton, "because it is outputting at 108 MHz, which is the way that the system is set up to do 54 MHz/i, or 54 frames-per-second. If you had it at a lower MHz rating, you'd actually start to see image degradation, because it is not updating the screen fast enough. When you're wearing the StereoGraphics glasses, it's turning one eye on and one eye off, and that left/right rate is being synchronized by the workstation, so that's how you see the 3D. By running it at a higher frequency, you can actually get a higher frequency per eye. The infrared transmitter/receiver on the workstation is actually sending out the impulses to the receiver in the nose of the

glasses that are actually shuttering the glasses on and off for each lens. The head tracker uses ultrasonics."

What about applications to full-motion video with its 30 frames-per-second rate, which falls well below the 54 frames-per-second rate of the SPARCstation? "Right now," replies Shelton, "we are using this technology for image generation, and will be looking at developing compatibilities between VR and video, but we haven't reached that point at this time." And sound? "Stereo sound is a possibility. We didn't want to develop a multimedia application at this time, but to provide the working foundation for VR and show what is possible.

"There are companies like Sense8 and WorldDesign that are building toolkits for VR on UNIX and companies in Europe also that are building applications toolkits and software for VR. That's not what we're doing; we want to build the basic system support to allow those guys to actually develop applications. There are large

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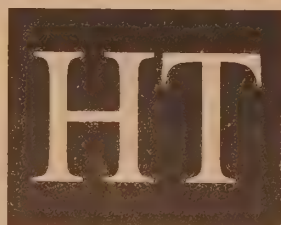
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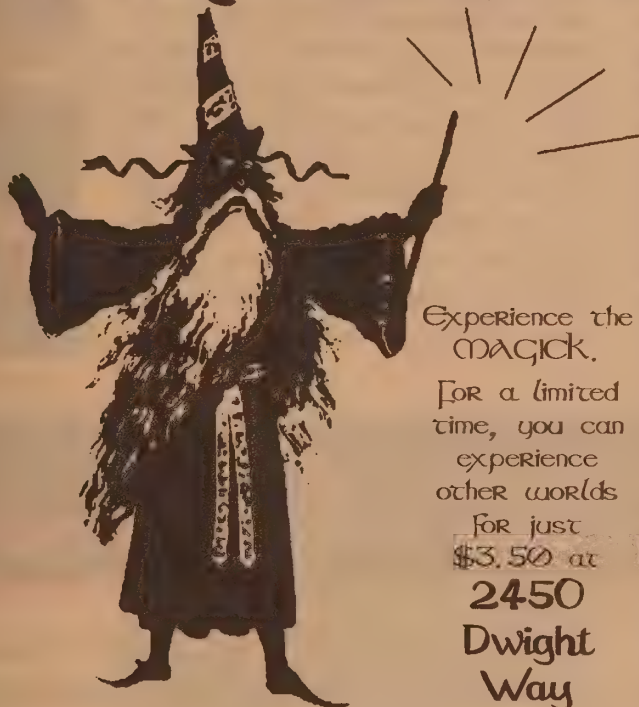
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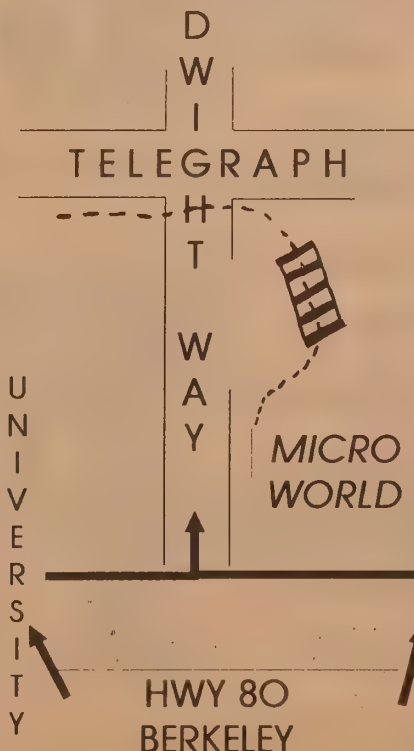
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companies who have developed proprietary applications in-house for their own software. Because of their competitive positions, they are not yet willing to go public on how they are using our systems.

"We've built a VR library that allows you to actually make the calls through XGL so that its a complementary part of XGL, and we're including that at no cost as a supplement of the library that will go out on the developer's kit. With the XGL license, you will be able get these libraries of VR applications like routines that make the serial calls and the tracking algorithms that you would use to write a VR application. A special VR software

developer's release for the Solaris 2.x operating environment for Sun workstations will be available in the very near future."

MAPPING TO THE REAL WORLD

What about file exchange and importing and exporting data? "The room document that is part of the demonstration is actually an AutoCAD 3D wireframe file with a Radiosity lighting model that shaded it, so it is definitely possible to bring in GIF, AutoCAD and other file formats. Autodesk (in Sausalito) has a VR program going on. If an architect wants to take the 3D document that has been worked on in the VR environment and output the actual data out to his design group for plotting and specifications, he can definitely could do that. People have already been talking

about using the SunVR system for the realtime 3D VR display of remote sensing data, such as for undersea probes and nuclear reactor repair. The Navy has been studying this VR for using it with a stereo camera in the shipboard training of underwater sea mine defusing procedures."

What about file size of VR documents? "The file size of these 3D documents," Shelton assures us, "is really not that great. For instance, the room in the demo is about 2MB. The stereo data component doesn't add much to the document in terms of the actual file size. Unlike some stereographic systems, it does not demand a pair of images for each frame. To output the document to stereo is basically a call to bring a stereo subroutine into effect to generate two images that are 'x' far apart. It's not necessarily to reside in the document itself. It's a 'low-calorie' application rather than a heavily loaded storage demand situation." ■

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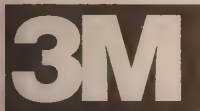
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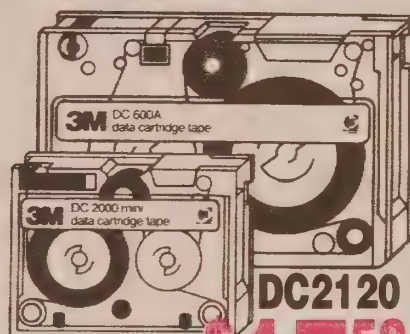
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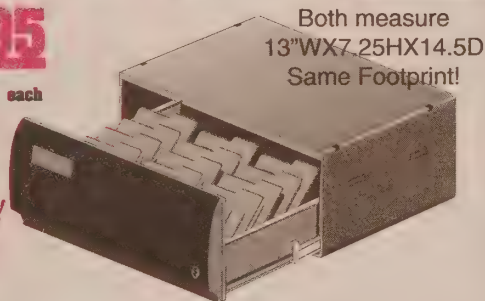
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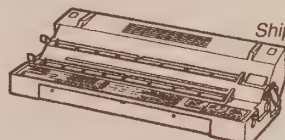
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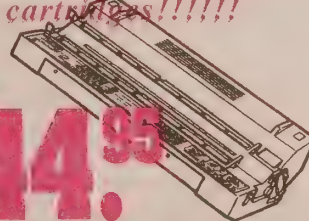


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Over the last several years, a quiet revolution has been underway, almost unnoticed by some business users, but one that is changing the lives of many performers and composers. Leading this revolution are MIDI music programs—a standard protocol that allows music instruments and computers to talk to each other and be combined into networks.

The emerging generation of Windows MIDI multimedia products do more than just allow you to record and edit instrumental music nonacoustically, i.e. as pure digital information. These products are important for a growing variety of users, ranging from those who want to take advantage of the new tools to learn music in a way never before possible, to professionals for both album recording

and film scoring projects. Plus, you don't even have to be a musician to use MIDI software. There are libraries of music by well-known artists and composers loaded into MIDI editing programs, letting you redo the music in any way you wish.

This article will look at three Windows products—Master Tracks Pro 4.0 and Encore from Passport Designs, and Cakewalk Professional For Windows by Twelve Tone Systems. But before turning our attention to these products, it is important to mention two of the key advantages from using music and other multimedia software in the Windows environment. The main one is the ability to easily break the MS-DOS 640K memory barrier. This lessens the worry of running out of memory-based resources before finishing your multimedia project. Secondly, and close behind, is the ease-of-use from GUI programs, providing the developers haven't made too many poor design choices.

MASTER TRACKS PRO 4.0

Master Tracks Pro 4.0 is a 64-track MIDI

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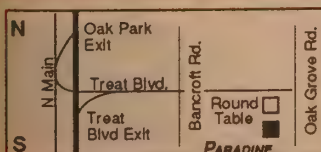
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Multimedia beyond



sequencer, available for several platforms, that's been consistently improved over time (and updates). The first thing you will notice is its intuitive design and ease-of-use. In addition, the Windows version can support a dual MIDI interface hardware setup to give you thirty-two MIDI channels, instead of the usual sixteen.

block, and record buffer. The free memory figure represents the total amount of memory available under Windows. Ordinarily, this amount would also be available on Master Tracks Pro. However, in enhanced memory mode this also includes virtual memory, which Master Tracks cannot use.

An important feature of MIDI for mak-

and resource saving feature that allows you to loop, or repeat, a few measures on one track while allowing others to run their full course. Thus, if there are accompaniment parts that are repeated, you don't have to waste memory storing the same note data over and over. This is particularly useful mainly in developing your score. In finished arrangements you would usually want to copy the actual data in the measures of looping tracks making it sound less mechanical.

Rather than having one massive program that does everything, by having different editing operations in separate applications saves memory use and offers greater flexibility in your editing.

One of the important capabilities of Master Tracks Pro is the simultaneous recording on several MIDI channels and sequencer tracks. This not only means that it is capable of recording a complete MIDI band live, but it can also transfer complete arrangements between computers or hardware-based sequencers in a single pass. If, for instance, you use a MIDI keyboard that includes a built-in sequencer, you can transfer the sequence directly into Master Tracks Pro for recording—capturing all of the tracks in a single process. Likewise, if you have arrangements in an older MIDI program that doesn't support the newer MIDI formats you can use two computers with MIDI interfaces to convert them.

This program offers many features useful for multimedia developers, including Fit Time, Scale Time, and Marker facilities. The Scale Time option is useful for making a section of an arrangement run at half-time, double-time, or some other proportion of the starting tempo.

With any large multimedia project, it is always necessary to estimate the machine resources and amount of memory that will be required. With Master Tracks Pro you definitely need to think about this because the memory available for a sequence will not always be identical to the memory available under Windows. Master Tracks Pro uses a Memory Window to show the size of five different memory figures: free memory, score size, clipboard size, largest

ing finished arrangements is the ability to send program or patch changes "on-the-fly" while a piece is in progress. Without this, the number of instruments you can use in an arrangement is limited to the number of MIDI channels available, which is generally sixteen (with some boards thirty-two). MIDI packages differ widely in their ability to handle program change messages easily. Master Tracks Pro uses a graphical window to let you see and modify any or all of the program changes on a given track. This is convenient because it puts all the changes for a single track in one place where you can see them all. But because you can't see the program changes for all the tracks of your arrangement in one place, this convenience is limited.

Clicking on the Volume button opens a panel with an array of sliders for interactively setting the relative volume level for each track. If you drag the volume sliders while music is playing, you can hear the volume change as the music plays. Any time two or more tracks are assigned to the same MIDI channel, the volume faders are automatically "ganged" together so that all the faders assigned to the same MIDI channel move in unison. Master Tracks Pro also has a special mixing facility for users of Media Vision's Pro Audio Spectrum boards. By selecting the mixer option, the volume faders on the Track Editor can be routed to the multimedia mixer on that board.

Master Tracks Pro has the handy time

ENCORE

Encore is a notation program, also from Passport Designs, with MIDI playback and entry that can serve a dual or even triple purpose. Typically, notation programs allow you to enter music as it appears in published music scores. They are often simply desktop publishing packages designed for music. Encore offers quite a bit more. It facilitates composition and arranging by allowing you to hear the music as you create the score. And once this is completed, it can give you a publication quality printout. Encore also has an excellent transcription facility that allows recorded MIDI files to be converted into scores. This can save both time and money—letting you first record the music and then converting your performance into a score, automatically.

A handy feature that not all notation programs have is the ability to select several notes with the mouse and change their time value, or note parameter, through a menu option, rather than having to delete everything and re-enter the new valued notes.

One of the things I particularly like about Encore is that it is set up well for writing a skeletal score like a piano or band part and later expanding this to a more elaborate orchestration. What allows this is the Insert Staff command, which automatically adds a staff for an additional instrument throughout the entire score. This is an important feature because without it, expanding an orchestration might involve some tedious and time-consuming cutting and pasting.

Encore lets you have up to four different lines of notes to a staff, each on its own MIDI channel. There are at least two very practical uses of this. One is making horn arrangements very quickly. In most parts that use different horns playing different notes of a chord, you can just write the

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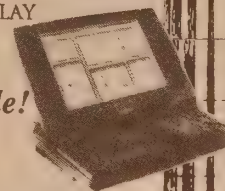
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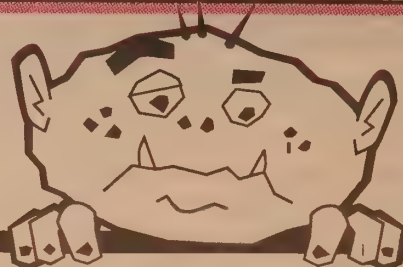
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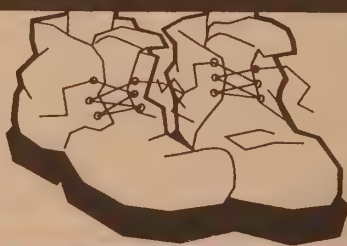
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chords on one or two staves as they would appear on a piano or conductor's score by making use of the voice selector. The other use for this is making drum and percussion arrangements that go onto one or two staves.

Working with grace notes, both for paper scoring and MIDI play back, has been a stumbling block for many MIDI notation programs. Encore has built-in facilities for including chord symbols and tablatures as well as lyrics. For instance, lyrics that automatically align are entered by first selecting the note to which you want them to be aligned.

Encore, complemented by Master Tracks Pro or another Windows MIDI sequencer package is an excellent way to work. Rather than having one massive program that does everything, by having different editing operations in separate applications saves memory use and offers greater flexibility in your editing. This combination of software is ideal for those who write as well as perform music.

CAKEWALK PROFESSIONAL FOR WINDOWS

This veteran 256-track sequencer has been around for years as a DOS program prior to its recent migration to Windows. One of the main things it offers over other sequencers is greater visibility of entire arrangements. It also has a built-in programming language for writing routines for offline processing of music files. There are some good innovations in user interface design too, and the ability to embed various multimedia events for playback concurrently with music sequences. A new feature is the ability to represent music in notation graphics.

Unlike most sequencers, Cakewalk allows you to have Piano Roll windows for several different tracks open at the same time. This is important for song arrangers because it gives visual and instant editing access to what is happening in different musical parts. You can view more than a single track window while the music plays, and as soon as the exact notes you want to change appear, simply stop the sequence, make your changes, and continue. Having this ability is one of the things MIDI editing is all about.

For individuals working with recordings of live performances, whether on audio tape, film, or video, Cakewalk lets you place song lyrics as text events on a separate

track. When a piece is played the text can be displayed on the screen as a kind of "bouncing ball" lyric prompter. Cakewalk also supports fractional tempos, tempo values of beats per second expressed as decimals. It uses tempo ratios to make tempo changes on-the-fly. (A tempo ratio is a number that is a multiple of the base tempo of your sequence.)

The View feature offers several impor-

Encore, complemented by Master Tracks Pro or another Windows MIDI sequencer package is an excellent way to work.

tant functions. An Event list provides the ability to see events on all tracks, listed on a single list. For those who can read music notation, the Staff View lets you see as many tracks at once that you want, all in regular music notation. Several editing operations can also be done in this view, such as changing the pitches of individual notes. A nice innovation in the Piano Roll View editor is the option to show a graphic bar display of the velocity of the notes on a given track. Unfortunately, the bars used to represent the note velocities are very slender lines that on some monitors may be barely visible.

With Cakewalk you can include Media Control Interface (MCI) commands in sequences. MCI commands will appear in the Event List View. This means, for example, that you can combine .WAV sound files with MIDI music in a sequence. However, you need a digital audio sound card like Sound Blaster, Pro Audio Spectrum, or MultiSound, as well as the Windows .WAV driver to accomplish this.

I'm not delighted about everything in the Cakewalk design. The one drawback is the Faders View panel. It is poorly designed, showing only the track number and controller type in line with the fader slide button. Instead of wasting space by printing the word "Track" redundantly on each line, it would have been much better to leave space for the instrument name and MIDI channel name.

with Cakewalk Professional is for writing little programs that do offline processing of music sequence files, as opposed to making things happen in realtime as they play. The sample programs included give some idea of the types of things you can do with this. One program, for example, takes a series of notes and, using them as the root, creates chords from them. Another thins out superfluous controller data. And there

is one that scales note volumes by the percentage you supply. It can also be used for writing patch editing routines.

CAL has a syntax like LISP, but resembles languages like C and Pascal in that you have to declare and initialize variables. It has a full set of math and assignment operators that are also reminiscent of C. The language has some nice features, such as functions that can take a variable number of arguments. There is no support for file i/o or user interfaces, so forget about doing anything elaborate with CAL.

A NEW GENERATION ARRIVES

Overall, I'd say that the new multimedia-oriented MIDI programs for Windows are a sufficient improvement over earlier DOS programs to constitute a whole new generation. I've found that the improvements make a very noticeable difference in both the quality and efficiency of work on real projects. There are various multimedia programs of different kinds appearing now, but most of them are set up just to use already finished sound or music files. They assume that you already know exactly how long these sound as music events are to last, and when they are to be triggered. They don't have any editing tools to help you determine this. The programs I've discussed here are an important approach to multimedia development that is going to increase in importance throughout the nineties. ■



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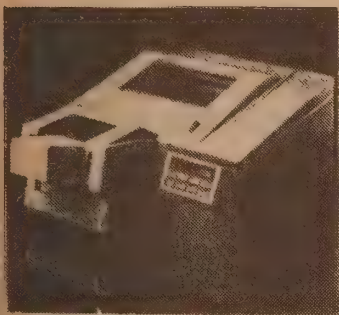
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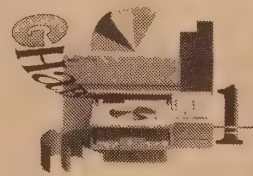
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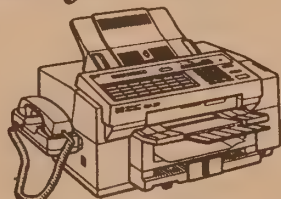
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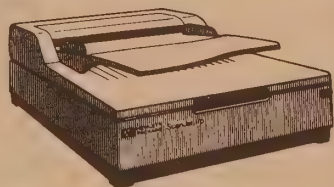
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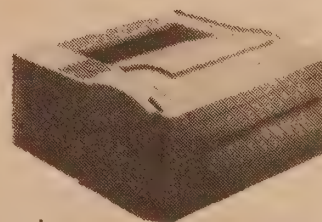
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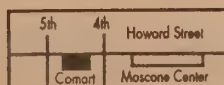
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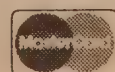
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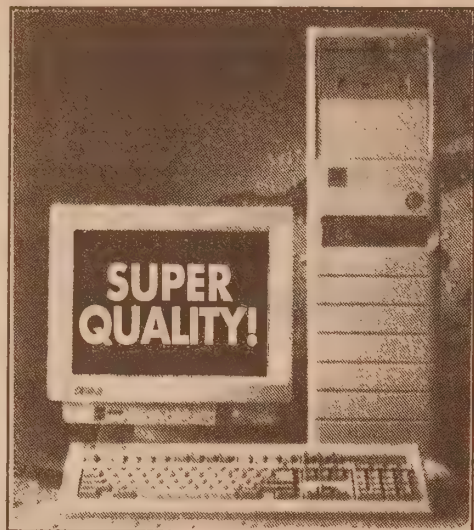
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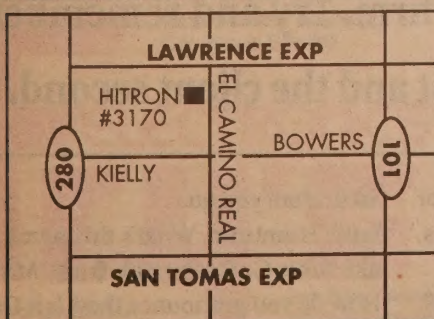
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Secret Tapes Revealed For First Time

Or The Hiring Of A Public Relations Expert

BY JOHN C.
DVORAK

Through negotiations with a former KGB operative working under deep cover in the Silicon Valley area, MicroTimes was able to purchase a set of tapes that revealed the secret procedure for hiring public relations people to work in the high technology field. The excerpt below is part of a longer interview and was only edited for the purposes of fitting it into this column.

The participants' names will not be revealed; we'll use the generic name Jack as the company owner and Jane as the interviewee (who eventually got this job).

DVORAK'S LAST COLUMN



Copyright © 1993 by John C. Dvorak. All rights reserved. John C. Dvorak graduated from the University of California. He is a contributing editor of PC Magazine and MacUser, and is considered by many to epitomize the contrarian view of things—a charge he vehemently denies. Dvorak's motto is: If you have nothing nice to say, then don't say anything at all.

Jack: Welcome, have a seat.

Jane: A seat? What do you mean?

Jack: Be seated. Sit down. Right there in the chair.

Jane: Oh! I'm sorry, I thought you meant something else. I've been dieting.

Jack: Don't worry. For some reason none of the women we hire, and we hire only women I might mention, understand "have a seat."

Jane: That's good to know. So I'm doing OK?

Jack: Excellent.

Jane: Why do you hire only women?

Jack: Because in high technology the players are 95% men and few of them get out much. They need to see a good-looking babe once in a while.

Jane: Should I take offense at that? Good-looking babe?

Jack: It's a fact. Besides that, you're a good-looking babe.

Jane: Why thank you! Do I have to date you?

Jack: No, I don't believe in fraternization. But would you if I asked?

Jane: I have a boyfriend. But if I didn't I might! Do I have to date the guys I talk to?

Who are these guys? You said the business was 95% men. Is it some gay thing?

Jack: It's computers, and dating the guys is up to you. I'd talk to the other girls first. None of them date any of the guys in the business. Too geeky. Too dorky. A lot of the guys in the business are rich and you might want to line one up, but forget about the media guys. They're all broke and they're just as geeky.

Jane: I think I'll skip the idea of dating...unless, of course, the guy is really rich.

Jack: Good thinking. How much do you know about PR?

Jane: Nothing.

Jack: Perfect. The job is mostly calling journalists and asking

them if they received a press release. They hate that!

Jane: They hate it? Then why do we do it?

Jack: To promote the PR firm. Try and remember that we promote ourselves first and the client second.

Jane: What's a client?

Jack: The job is mostly calling journalists and asking them if they received a press release. They hate that!

Jane: They hate it? Then why do we do it?

Jack: To promote the PR firm. Try and remember that we promote ourselves first and the client second.

Jack: The client pays us to promote his or her product. We pass out press releases, talk to writers, and stuff like that.

Jane: Cool. Do I get to write a press release?

Jack: It depends. Did you get a college

degree? Can you write?

Jane: I went to JC and got my AA in marketing.

Jack: Really? That can come in handy. Can you write?

Jane: No, not really.

Jack: Good. Neither can I. Do you know how to hand something to someone?

Jane: Yes, I'm really really good at that.

Jack: Great, because you'll have to hand out a lot of things. It's a lot of fun, especially at trade shows.

Jane: Wow, this sounds like a great job.

Jack: It's a terrific job, are you kidding? You get to fly places in an airplane and hand out stuff and call people up and bug them. I love it.

Jane: It sounds great. Do I get the job?

Jack: If you want the job, it's yours.

Jane: Wow! Really!?!? When do I start?

Jack: You start right away. Here's a list of writers. Introduce yourself to them, tell them the company name—our company, that is—then ask them if they received our press release for Dumbo Computers.

Jane: OK, great. Do you have the list?

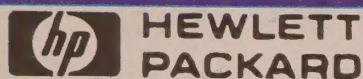
Jack: Here you go.

Jane: Hmmmm. What's this name...De-bor-ak? John C. De-bor-ak from MicroTimes. How do you pronounce that? Is it De-bor-ak?

Jack: Exactly! You're perfect for this job! ■

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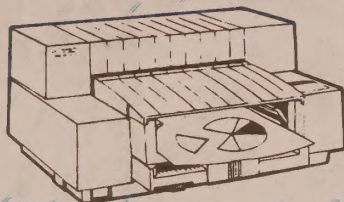
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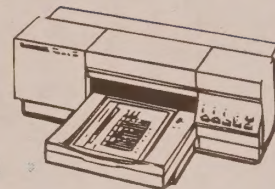
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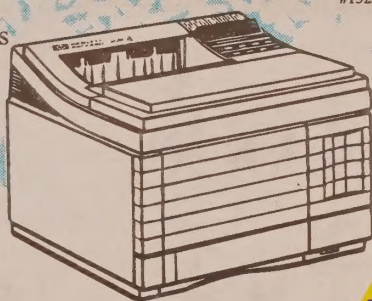
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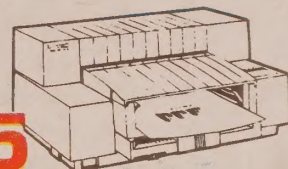
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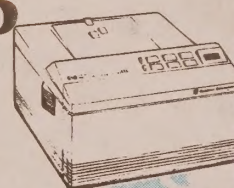
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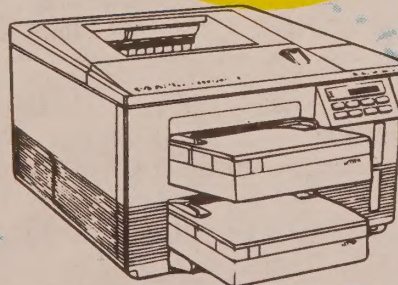
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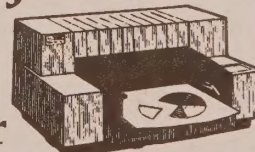


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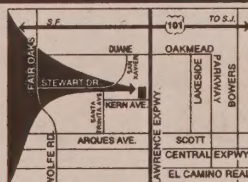
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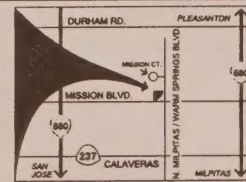


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Even a *free* memory manager may not be a bargain—especially if it can't give you all the memory you need.

Introducing QEMM 7 The Memory Manager Worth Paying For

The newest version of QEMM, version 7, pioneers new ways of using the critical area between 640K and 1024K. It optimizes this area, taking into account the many drivers that need more memory at start-up than when running; instantly calculating millions of possible memory configurations to find still more memory for your applications, TSRs and utilities to use.

Instant Riches

What does more memory mean in a practical sense? It means that your DOS and MS Windows programs run faster, smoother and more reliably. It means you can continue to add valuable utilities, drivers, TSRs and new capabilities to your PC. Whether it's workhorse drivers like LAN utilities and fax drivers; productivity-enhancers like disk caches and disk compressors; or fun and exciting capabilities like sound boards, CD ROM drivers, graphics tablets, etc. The better your memory is managed, the more versatility and flexibility your PC will have. QEMM 7 lets you have it all without fear of 'out of memory' messages or crashes.



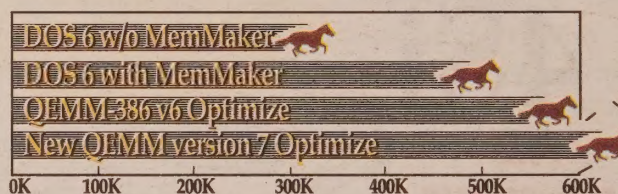
DOS 6 Giveth; DOS 6 Takes Away

The best feature of new DOS 6 is the stable of utilities it includes. Trouble is, they all eat up memory. DoubleSpace file compression needs 43K, Vsafe anti-virus needs 7-45K, Smartdrv disk cache needs 28K and even Undelete takes 10-14K as a resident program. Using MemMaker, you could easily lose—not gain—available 'conventional' memory in DOS 6.

New QEMM 7 takes the best of the new DOS 6 features into account, finding ways to cut memory demands for these utilities by up to



How to Look a Gift Horse in the Mouth



We tested DOS 6 with and without MemMaker and QEMM6 and our new QEMM 7 runs away from all of them. See details of test conditions listed below.

80%, ensuring that the all-important memory below 640K is free for your programs. And QEMM 7's seemingly small feature of supporting

DOS 6's multiple configurations gives you the flexibility and ease of setup that you expect. (MemMaker doesn't work well with this important DOS 6 feature.)

Page Frame: the Key to Your Future

There's been a lot of jealous talk about our patent-pending Stealth technology. Nobody else can duplicate its 48-115K gains.

The key to Stealth is its use of a 64K reserved area above 640K called the page frame. Besides being used by Stealth, the page frame lets Lotus 1-2-3 r2.x run larger spreadsheets and WordPerfect 5.x larger documents. It's also used by DESQview for multitasking, Novell Netware, IBM LAN Server and DECnet for reducing the network driver memory footprint, plus games for fast action. You sacrifice all this when other memory managers turn off the page frame. Stealth saves you room to set up your PC with a mouse, CD ROM, sound board, a network such as Novell NetWare, create 8-24K of extra memory for optimal MS Windows performance, use all of DOS 6's memory-hungry utilities and still have more than 630K to run applications smoothly and safely.



Prior versions of QEMM won just about every competition in sight, as well as remaining the #1 best-selling memory manager 5 years straight.

Put Your Money on a Winner QEMM 7

The new and ever more exciting capabilities coming to your PC will all compete for memory with your favorite applications, TSRs and drivers. And that makes QEMM 7 the most vital utility you can own.

Our seventh-generation memory manager is a thoroughbred that helps you get the most out of your PC today and tomorrow.

Quarterdeck

How we got the chart numbers: CPU—486/33 ALR Power/business VEISA machine equipped with 16 megs of RAM and running MS-DOS 6. Comparisons were done using the following memory managers: QEMM 7, QEMM 6.02, MS-DOS 6 MemMaker. In addition to the driver (or drivers) required by each memory manager, the following drivers, DOS resources and programs were loaded for all comparisons: in the CONFIG.SYS file: SETVER.EXE, DOS-HIGH, FILES=20, BUFFERS=10, STACKS=0, MVSOUND.SYS, SDBK12.SYS, SLCD.SYS, DOS.SHELL=statement, in the AUTOEXEC.BAT file: VSAFE, MSCDEX, UNDELETE, LSL.COM, NE2000.COM, IPXODI.COM, NETX OR EMSNETX, MOUSE.COM, SMARTDRV.COM, PRISCCAP.COM. ©1993 Quarterdeck Office Systems. Trademarks are property of their respective owners.

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